ENGINEERING NEWS-RECORD

Missile bases: Anyone can build them, but . . . *pages 23, 34*

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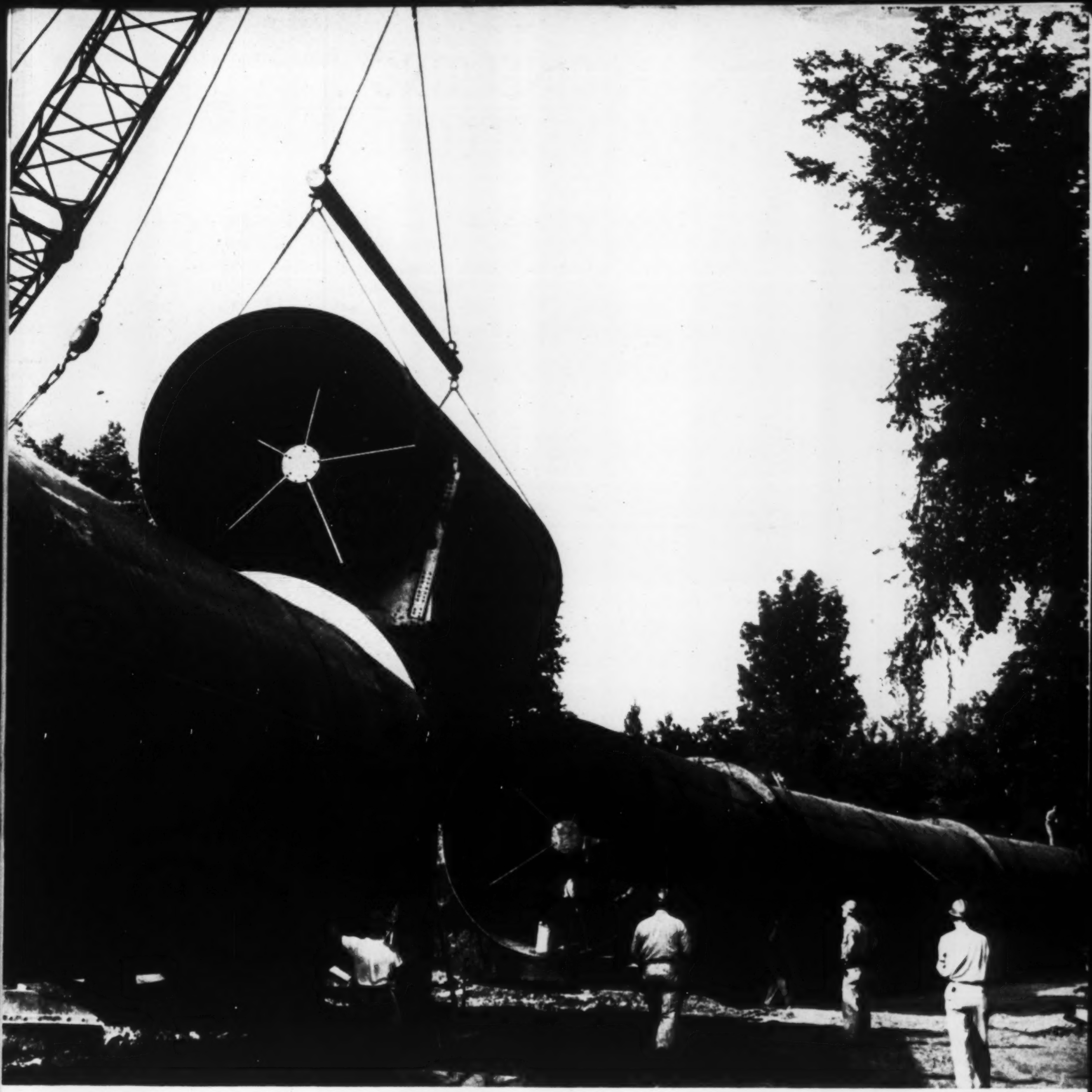

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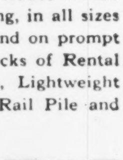

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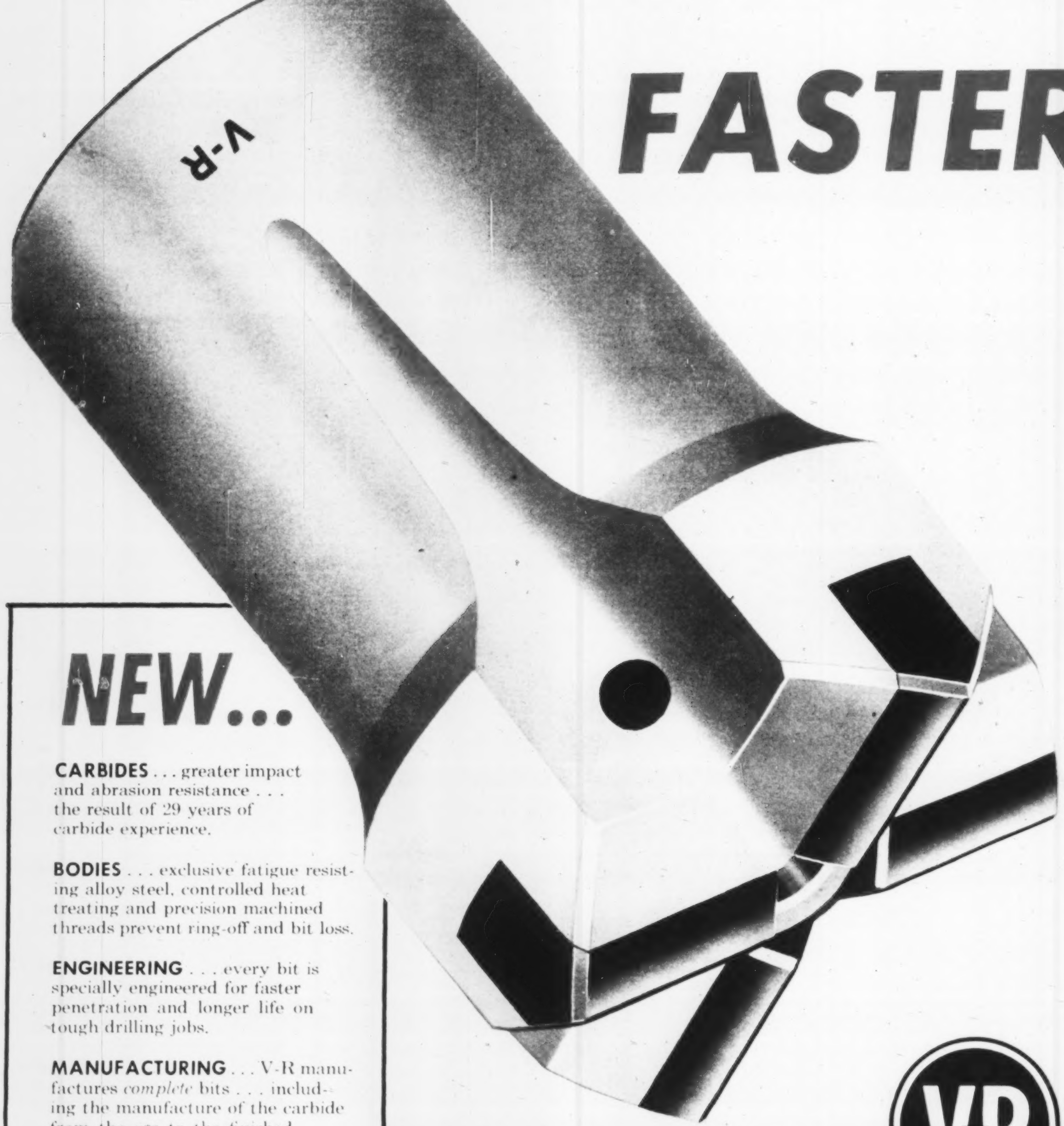

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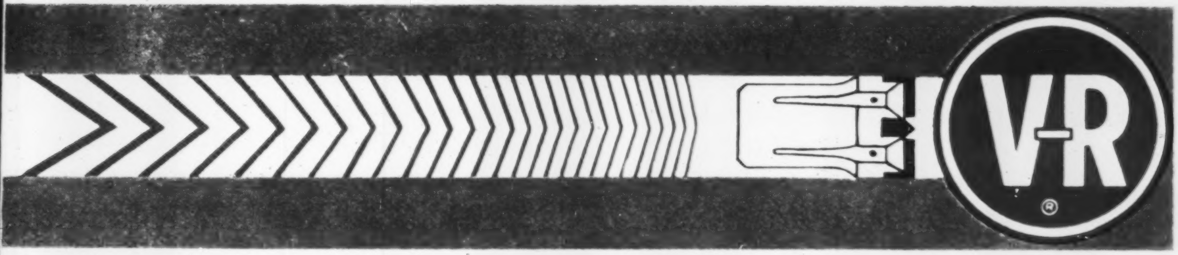

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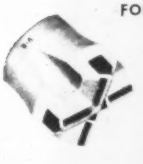

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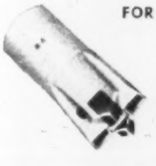

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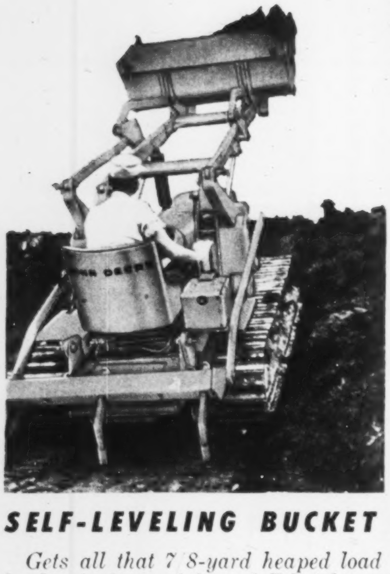

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Tripartite Wage Panel?

SIR—In answering your article on "What's Wrong With Bargaining" (ENR Aug. 13, p. 126), it seems to me after some thirty-five years of experience that the answer is rather simple as to what leads up to the present situation.

By way of history, in the old days we sat down and bargained over a nickel and once in a while a liberal contractor, who was on the bargaining committee, and had a rush job, would cast his vote with the union for 7½c. This rate was generally carried through all the trades to maintain a historical balance.

During World War II, the 15% formula was wrong. For instance, a 50-cent-an-hour laborer could get 7½ cents, a $1.50 mechanic could get 22½ cents and this upset the historical differential in wages. I know because I was the building industry member on the Wage Adjustment Board for some fifteen months and one of the cases was trying to correct the situation on paving in Washington, D. C., where the only existing contract was for 45 cents an hour and general building labor was getting 85 to 90 cents an hour. We solved the problem and thank goodness nobody took us into court.

Then came the building boom after the war and the number of government contracts were let with tight finishing dates and all the manufacturers were trying to get back into production of civilian goods, and unless you paid big overtime and in some cases $30 to $40 a day for mechanics you simply could not get them. This naturally led to the radicals saying, "If they can afford to pay that then why can't we get it," and this demand plus inflation forced business agents to demand the moon.

About this time various universities set up classes in labor relations and the union men flocked to them. I have heard of very few cases where a business representative attended, in fact I am told that 95% of the attendance were union men learning how to handle their negotiations with the employers.

We now come to the up-to-date and educated business agent. If his union wants a 12½-cent raise, he asks for 25 cents and haggles and bulldozes until the employer offers five to 10 cents and then he insists on a government conciliator, then argues to split the difference between the employer's last offer and his demands and I am sorry to say too many conciliators agree with him, and this puts him into the position to go back to his union and brag that he euchred the employer out of more than the original basic demand of the union.

It looks like the employer has now learned his lesson—offer nothing and ask for something, or make an offer and stand by it (General Electric technique), but back of this is the fact that the unions have accumulated fighting funds in the millions and the employer associations have trouble meeting their budget. And in addition the unions will help finance each other, but did you ever hear of one association of employers offering fighting funds to another association, as they do in Sweden, with the result that the unions have been forcing unreasonable settlements from the employer who could not and would not stand a long strike. May I ask at this time why it is that when an employer makes a few dollars he has to advertise it as profit. Why not say he has a clear net profit after money set aside to keep the plant modern and competitive. This, of course, would deprive the pork chopper of his cry that "we are not getting our fair share."

What is the answer? The electrical unions have it, where a national arbitration board settles all disputes that cannot be settled at the local level. They are in a position to know the economic consequences of what they do. The elevator constructors have an answer to their problem—the average of the five highest wages in the industry in the locality where the men are working.

Why not create a board similar to the 1943-1944 Wage Adjustment Board with union, employers and public members who would make final and binding rulings after due study of the economic consequences and thus avoid strikes?

S. D. BUTTS
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Calls Old Way Safer

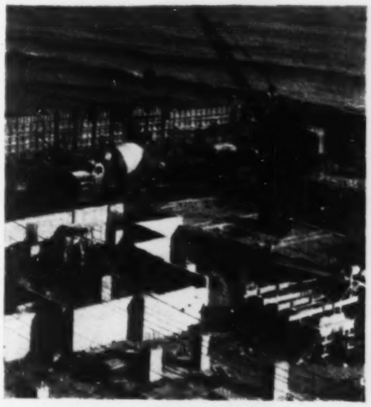
SIR—In these days when anyone with a tractor equipped with a backhoe is an excavating contractor, the idea of putting sheathing and braces in a trench is out of anyone's mind. Take, the old pick-and-shovel method in a supported trench was the safest way to dig trenches.

I guess that possibly I'm an old timer, but when one reads an article like the enclosed (from The State Journal, Lansing, Mich., Aug. 22; headline—Youth Is Suffocated, Rescue Effort Just Too Late) one questions the policy of "high speed and low costs."

ROBERT A. PALMER
Lansing, Mich.

(*Reader Comment continued p. 10*)

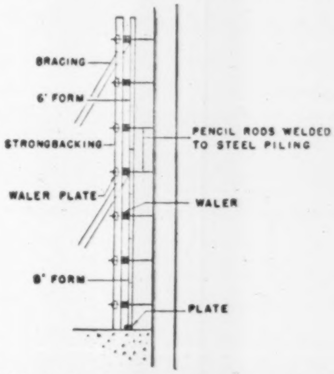
12¢ a Square Foot



Best Method to Pour 750 Ft. Retaining Wall

Symons Forms, Sheet Piling and Pencil Rod Ties

How to pour a 750 foot lake retaining wall with thickness from 12 to 20 inches and 13 ft. high, faster and more economical. S. N. Nielsen Construction Company, Chicago, had that problem on a 600 unit apartment on Lake Michigan shoreline. Since a fixed core could not be obtained while using sheet piling only, the superintendent used Symons Steel-Ply Forms with sheet piling and pencil rods as ties.



Was this method a success? After 250 feet of wall had been formed, poured and stripped, the forming costs were computed at 12 cents a square foot.

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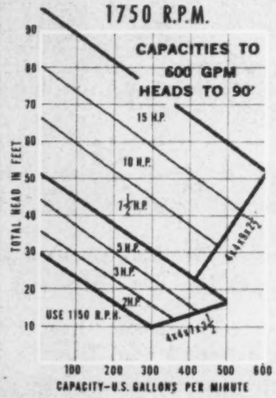

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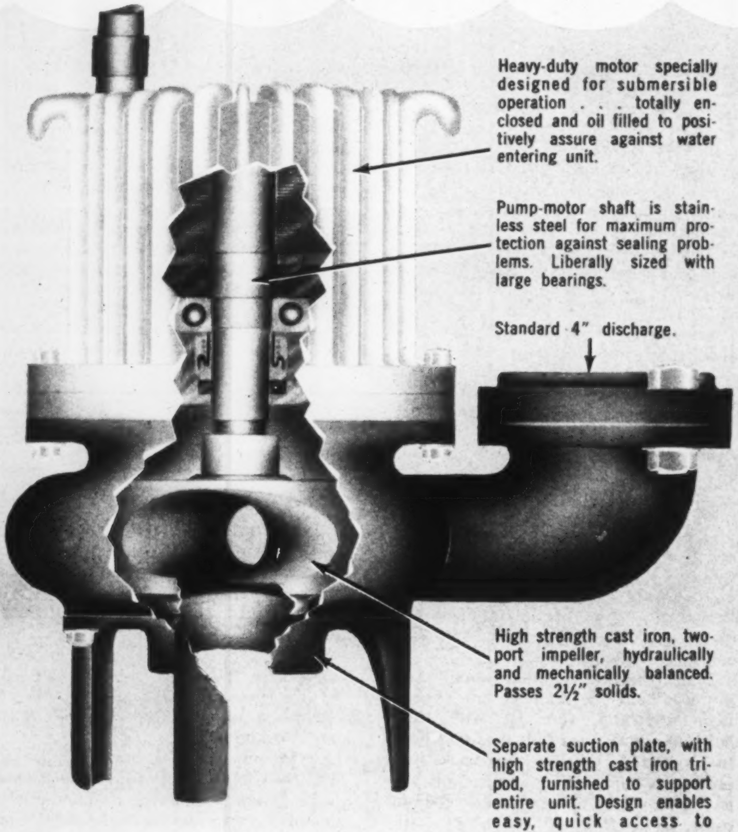

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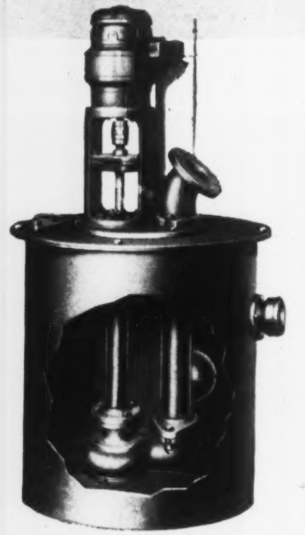

SEWAGE AND DRAINAGE PUMPING CALLS FOR A SKILL OF ITS OWN

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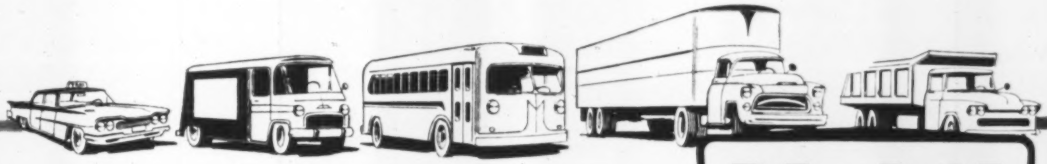

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Credit Due

Sir—My article "Make Pipe Gallery a Driveway" (ENR July 3, p. 62), omits proper credit. The design work on the Springwells expansion was carried out by a joint venture involving C. L. T. Gabler & Associates, architects, and Hazen & Sawyer, engineers.

The work was executed for the Department of Water Supply of the Detroit Water Board. The joint venture of the architects and engineers benefited greatly from the fine cooperation and useful suggestions offered by the members of the DWS staff, of which Gerald Remus is general manager, and A. C. Michael is assistant chief engineer.

Vail H. Moore
Consulting Engineer
Paxton, Ill.

Facts on Liquid Oxygen

Sir—The article "For Missile Bases: Antiseptic Contractors" (ENR July 2, p. 34) reports some misleading information in two of its paragraphs about the nature of liquid oxygen with respect to explosions.

The paragraphs state, "This is because of the nature of the fuels used in the missiles: liquid oxygen, helium, nitrogen and kerosene. Most can be dangerous, but the worst is liquid oxygen. It is tricky to handle and devastatingly explosive." And, "A demonstration given to workers drives home this point. Successively, a fragment of tobacco, a bit of lint and a bead of sweat are dropped into phials of liquid oxygen. In each case an explosion results."

To begin with, only kerosene of the materials listed can be classed as a fuel. Helium and nitrogen are inert gases and liquid oxygen is an oxidizer. An oxidizer does not explode, it provides the oxygen for explosive combustion of the kerosene. By itself it cannot burn or explode. It is non-combustible, but supports combustion of combustible materials.

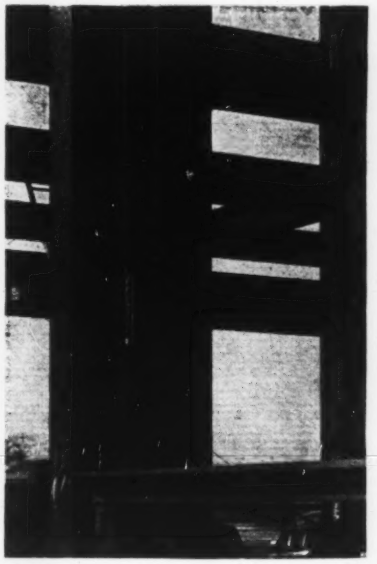
Furthermore, if we stop talking about liquid oxygen as a fuel then the familiar fire triangle of fuel, oxygen, and ignition source (heat) will be more easily remembered.

With respect to the claimed demonstrations to workers, no explosion will result unless the tobacco or lint are

(*Reader Comment cont'd p. 14*)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

There can be no compromise here!



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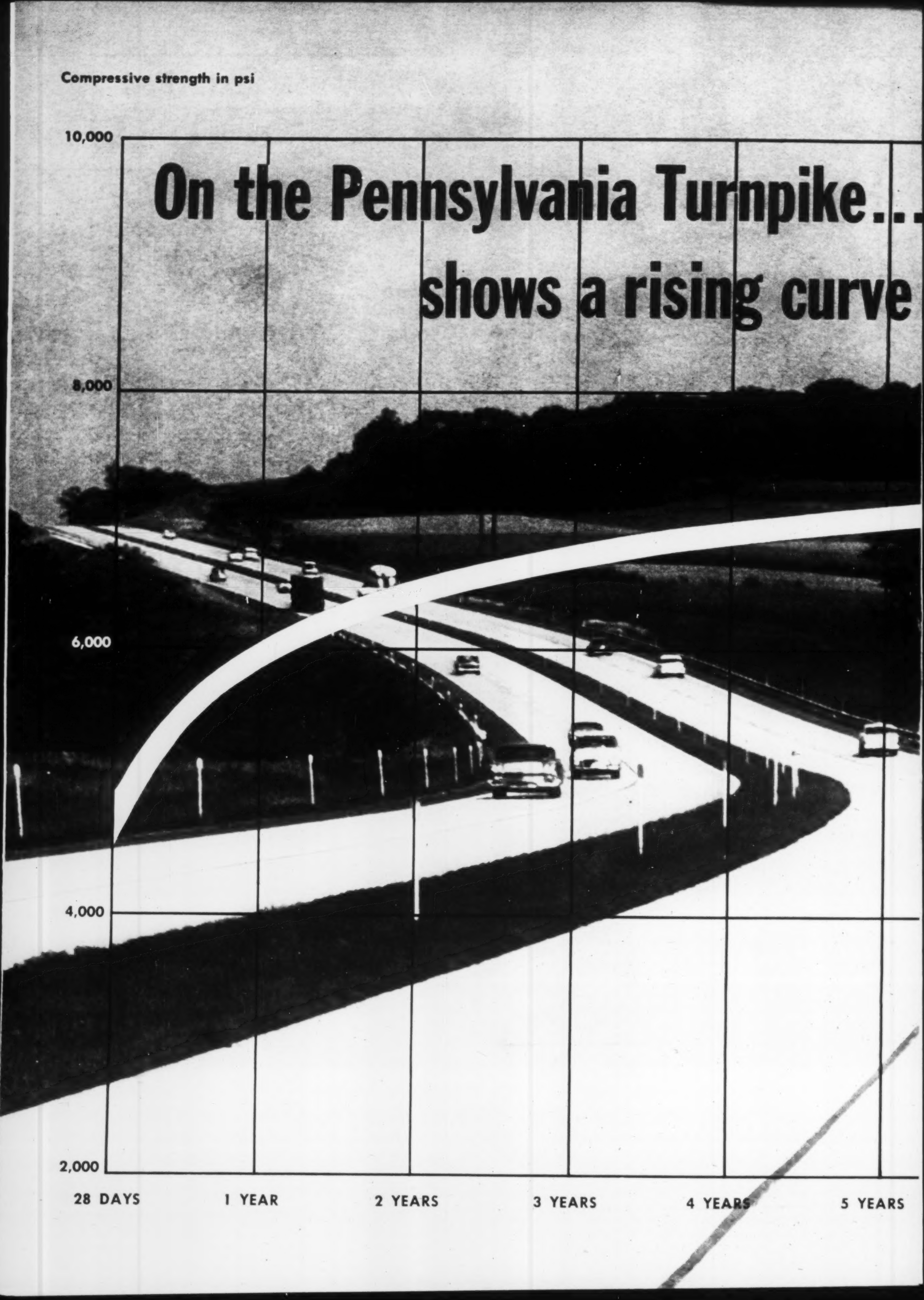
shows a rising curve



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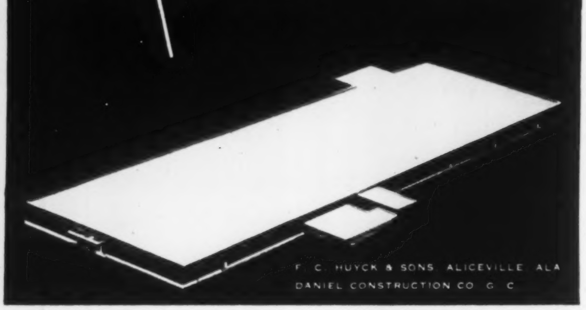

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ignited by some source of energy such as friction, heat, flame or shock wave . . . and no one has yet concentrated their ignition source to the point where such fragments of combustibles can be shown to have exploded with measurable force.

An authoritative reference that I can recommend may be found in INDUSTRIAL AND ENGINEERING CHEMISTRY magazine, September, 1957, page 81A, in an article titled "Survey of Hazards of Handling Liquid Oxygen" by C. S. McCamy, of the National Bureau of Standards.

F. C. SAACKE
Safety Director
Air Reduction Co.
New York, N. Y.

For Your Calendar . . .

Malleable Founders Society, Industry meeting, Hotel Sheraton-Cleveland, Cleveland, Ohio, Sept. 18. Write: Malleable Founders Society, 781 Union Commerce Building, Cleveland 14, Ohio.

Public Works Congress and Equipment Show, Seattle, Wash., Sept. 20-23. Write: American Public Works Association, 1313-E. 60th St., Chicago 37, Ill.

Steel Founders' Society of America, fall meeting, The Homestead, Hot Springs, Va., Sept. 21-22. Write: Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, Ohio, attn. George K. Dreher, Market Development Director.

Conference on Planning and Design of Urban Helicopter Facilities, Institute of Aeronautical Sciences Building, 7660 Beverly Blvd., Los Angeles, Calif., Sept. 21-22. Write: Los Angeles Chamber of Commerce, Aviation Dept., 404 S. Bixel St., Los Angeles 54, Calif.

Associated General Contractors, midyear meeting of governing and advisory boards, Hotel Muehlebach, Kansas City, Mo., Sept. 21-23. Write: Associated General Contractors, 20th and E Sts., N. W., Washington, 6, D. C.

International Conference of Underground Town Planning and Construction, Brussels, Sept. 21-25. Write: Mr. P. LaVedan, 94 Rue St. Lazare, Paris 9, France.

International Council for Building Research Studies and Documentation, Rotterdam, Netherlands, Sept. 21-25. Write: The Secretariat of the CIB, c/o Bouwcentrum, P. O. Box 299, Rotterdam, The Netherlands.

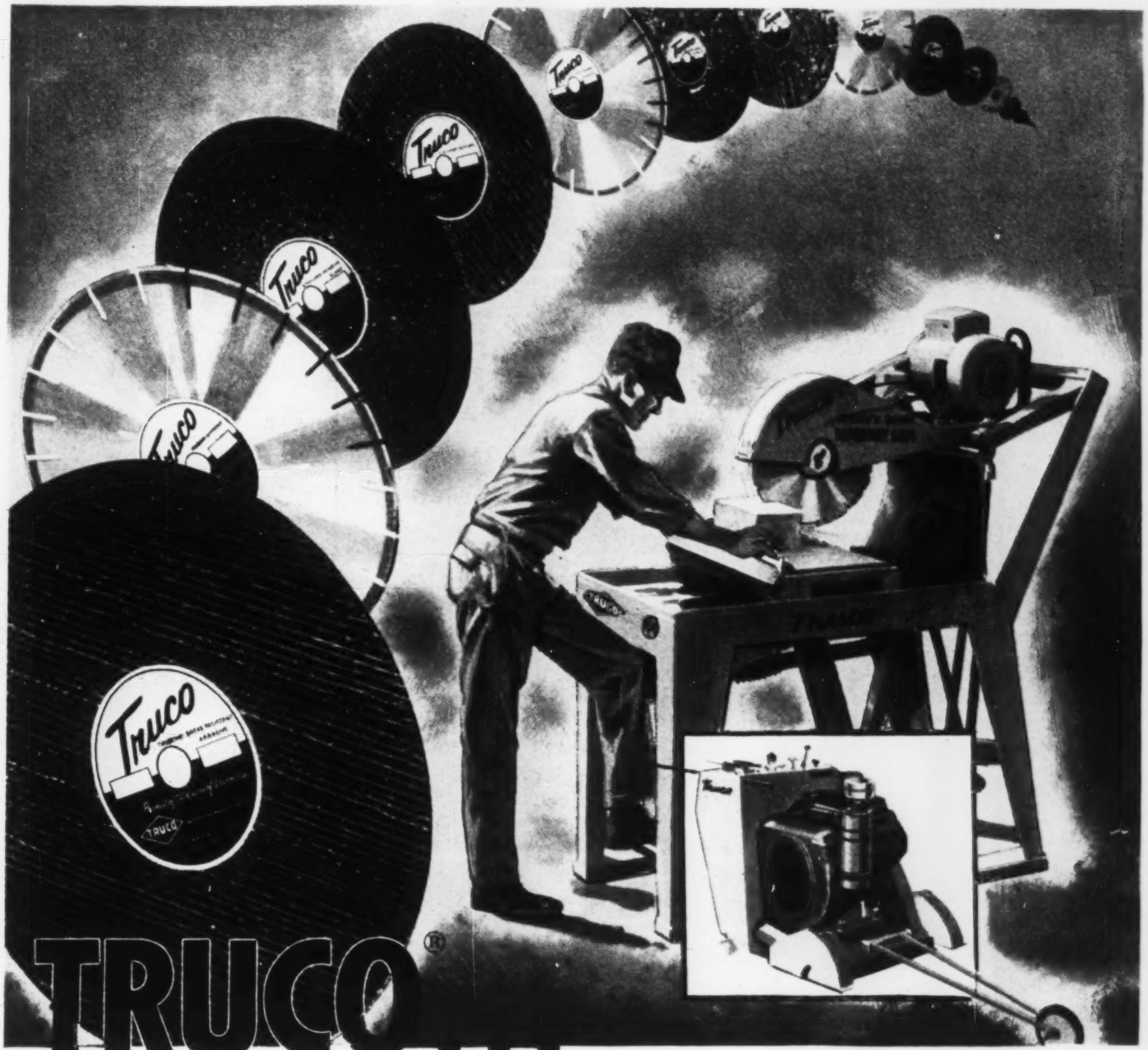
Industrial Nuclear Technology Conference, Morrison Hotel, Chicago, Ill., Sept. 22-24. Write: L. Reiffel, Armour Research Foundation Technology Center, Chicago 16, Ill.

Porcelain Enamel Institute, annual meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 24-26. Write: Porcelain Enamel Institute, Associations Building, 1145 19th St., N. W., Washington, D. C.

American Welding Society, fall meeting, Sheraton-Cadillac Hotel, Detroit, Sept. 28-Oct. 1. Write: American Welding Society, 33 W. 39th St., New York

Atomic Energy Commission, symposium on industrial uses of reactors, Commission Auditorium, Germantown, Md., Oct. 1. Write: Director, Division of Reactor Development, U. S. Atomic Energy Commission, Washington 25, D. C.

Sewage and Industrial Wastes Association, annual meeting, Statler Hilton Hotel, Dallas, Tex., Oct. 12-15. Write: Federation of Sewage and Industrial Wastes Associations, 4435 Wisconsin Ave., Washington 16, D. C.



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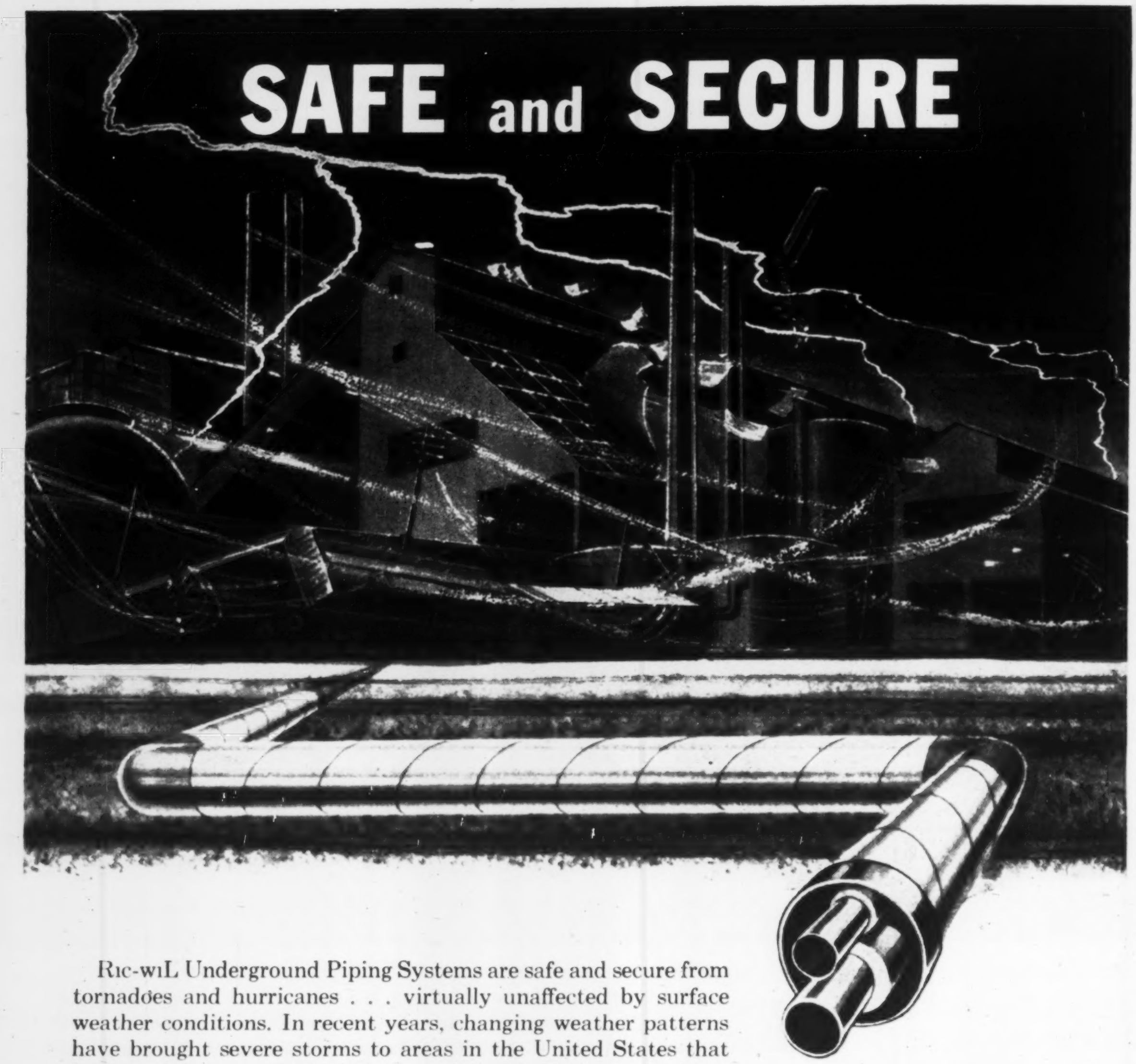

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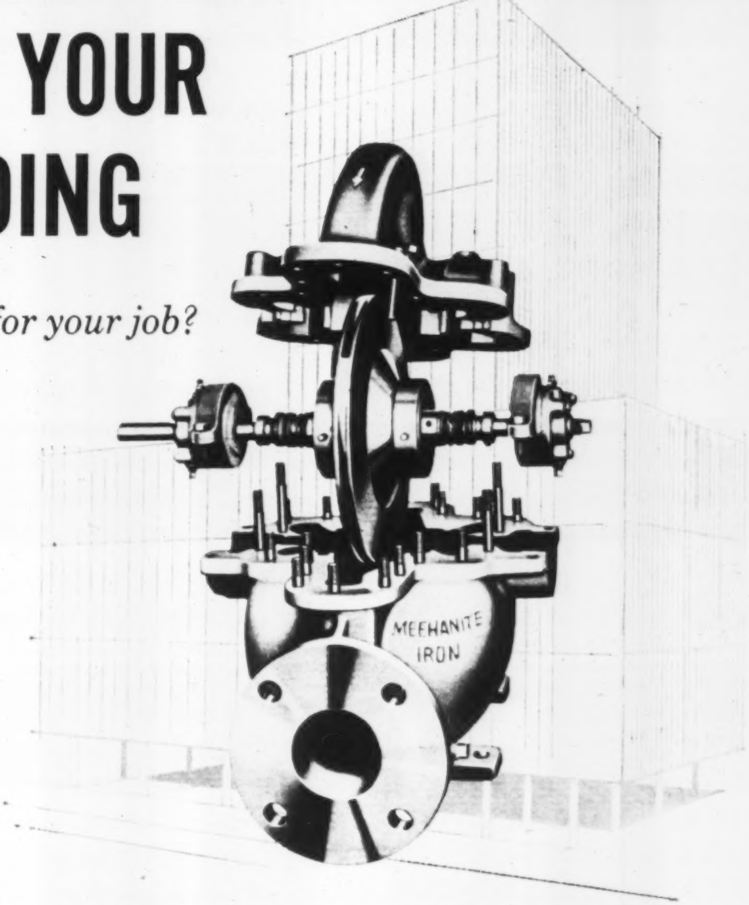

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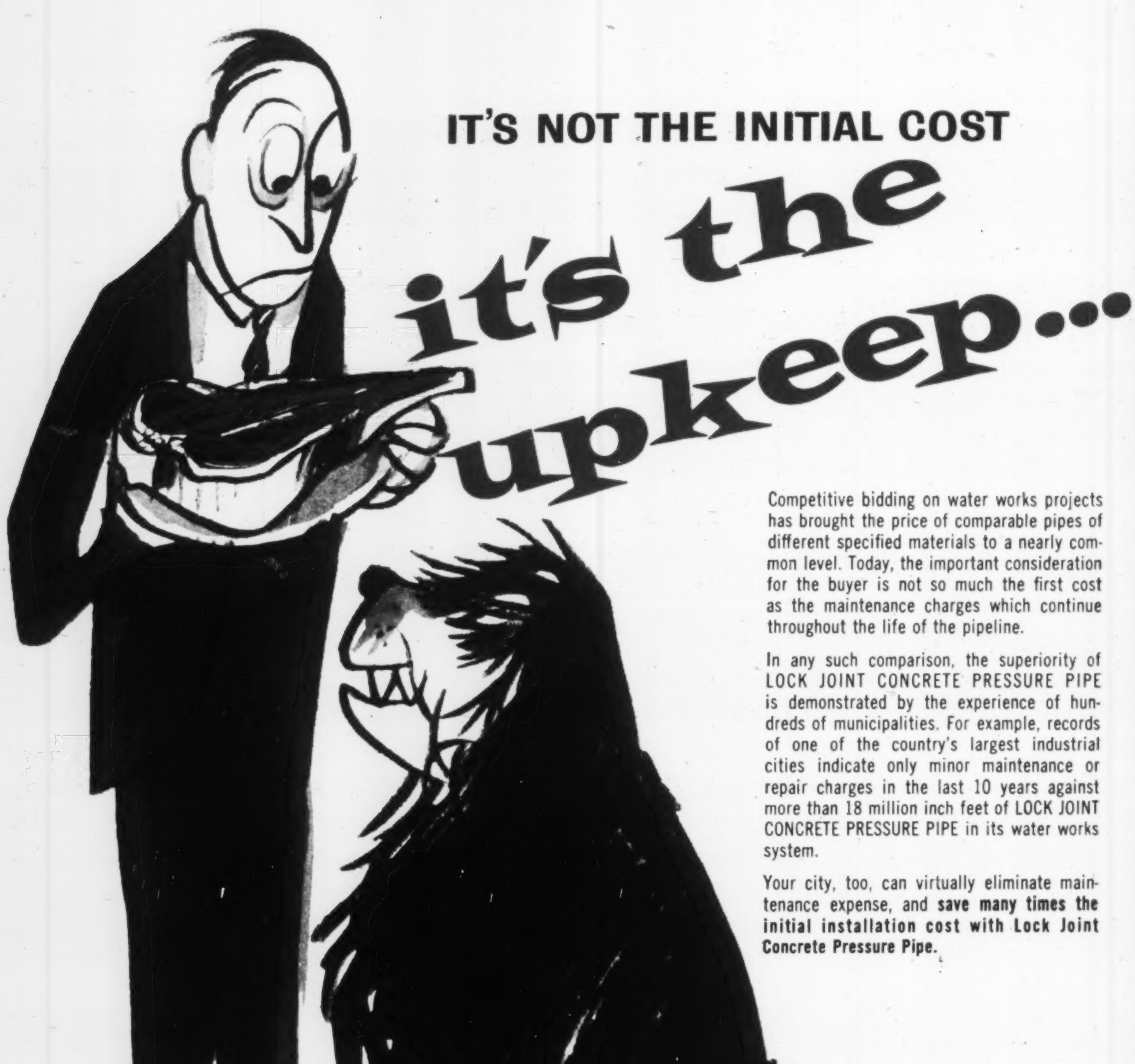

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

MORE HIRING HALL CONFUSION—The National Labor Relations Board has the Mountain-Pacific case back in its lap for reconsideration. The Ninth Circuit Court of Appeals holds a hiring hall provision that fails to contain the Mountain-Pacific language is not illegal per se. Critical test, it says, is what occurs in practice outside the contract. It also holds that a contractor association that signs a labor contract is an "employer" who can be held liable for a union's discriminatory practices.

AF CHAPEL FINALLY GOES AHEAD—Construction will start this month on the Air Force Academy Chapel at Colorado Springs after two trips to bidders and one "reject" by the Air Force. Robert E. McKee Construction Co., Santa Fe, N. M., will build the chapel for $3.38 million. Completion date is June, 1961.

BIG ONE FOR CHICAGO—A 22-story, $15-million international trade center will go up in Chicago at 500 North Michigan Ave. The structure will provide office space for steamship and air lines, travel bureaus and export organizations, and two floors of exhibit space for products moving in international commerce. Skidmore, Owings and Merrill are architects-engineers.

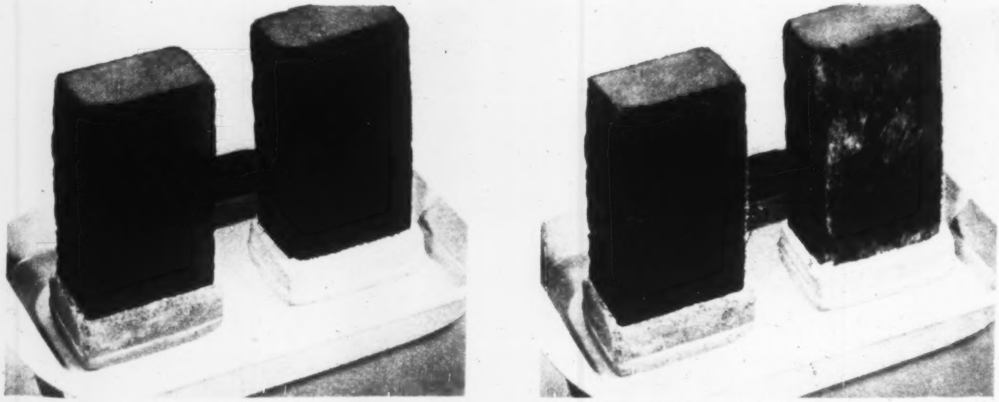
MUSEUM OF CONSTRUCTION—With a long and growing list of construction bigwigs for its board of trustees, the first cash contribution ($50,000) on hand and a starting date in mind, the proposed Museum of Construction at Pepperdine College, Los Angeles, is off and running. The $2-million project will also house the college's science department. Ground will be broken next January 2—at 10:45 a.m., to be exact.

WILL IT START?—Sale of $210 million in bonds to finance construction of the Chesapeake Bay Bridge Tunnel has been postponed. The offering was scheduled for this week, but it was withdrawn last week after commercial banks lifted the prime interest rate to 5% from 4½%. Spokesmen for the bond underwriters denied current interest rate increases were the reason. They say the bonds will be sold at the end of the month. The construction contract is contingent upon sale of bonds by October 23.

ZEUS MOVES AHEAD—The Army's latest step in the development of its anti-missile missile, the Nike-Zeus, is the award of contracts totaling $4.5 million for construction of testing facilities. The largest job is a $3.2-million firing battery on Kwajalein Island. Completion of the Zeus development program will mean construction of many new bases. Sites built for Nike-Ajax and Nike-Hercules missiles can't be adapted to the Zeus. (For more on missiles, see pages 23-25, 34, 36.)

BRIXMENT MORTAR

Helps Prevent Efflorescence



To test Brixment mortar and ordinary cement-and-lime mortar for resistance to efflorescence, "cap" two brick heavily with the mortars — let harden, and keep both brick for a few weeks in a shallow pan of water, as shown. See the difference with Brixment mortar!

HERE'S WHAT CAUSES EFFLORESCENCE—AND WHY BRIXMENT MORTAR HELPS CONTROL IT

Efflorescence is an outcropping of small white crystals on brickwork. It is caused by the soluble salts which almost all masonry materials contain. When reached by water, these salts dissolve. They may then be drawn by evaporation to the surface of the wall.

Brixment helps prevent efflorescence. The air-entraining, water-repelling agent in Brixment helps to prevent water from saturating the mortar and dissolving the small amounts of salts it may contain. Brixment mortar also helps prevent water from seeping down through the wall, dissolving the salts in the brick, and carrying them to the surface.

Contractors who have used all sorts of mortars say they have far less efflorescence with Brixment.

This is only one of many advantages which have helped make Brixment the most widely-used masonry cement on the market. It will be worth your while to hear *all* the advantages of Brixment the next time a Brixment salesman calls on you. Or write direct for full details.

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WASHINGTON OBSERVER

- **Highways: Solution is temporary**
- **Special session possible**
- **Water resources study coming**
- **Military construction: $1.36 billion**

- **The breakthrough on labor legislation** (see page 83) signaled the beginning of an adjournment rush for Congress.

Some problems remain, some lingering bad aftertastes are inevitable.

Highway financing is only temporarily solved. Congress moved to a decision with great reluctance. The future of the highway program is going to get some careful re-study during the next few months.

What Congressmen really fear is ever-rising prices that will put the same problem—raising new money for roadbuilding—back in their laps year after year. You can expect to hear more and more in the coming months about such possibilities as lowering the federal-state 90-10 ratio to 75-25 or 80-20.

The Democratic Congress and President Eisenhower are at swords point. The session of Congress promises to end with political animosity at the high point of Mr. Eisenhower's tenure.

Some vital construction legislation is directly involved. This was the muddled situation as this week began:

Housing: The President has the whip hand, and all he really wants is a simple extension of FHA mortgage insurance authority. Last Friday he vetoed the second Democratic omnibus bill and the Senate failed to override. Public housing, urban renewal, college building loans and housing for the aged are put off as big issues for the 1960 session. The only question left this year is FHA's insurance program—whether Congress extends it before adjournment or in a special session.

Public works. Democrats still want all those unbudgeted starts that caused Mr. Eisenhower to veto the original bill. In the House, there was strong sentiment to follow the lead of the Appropriations Committee which voted to slash all projects by 2.5% in order to ease the financial impact of the new ones at issue. In the Senate, some influential Democrats still threaten to attach the vetoed bill to the foreign aid appropriations bill.

—

- **The situation is entirely "iffy," but special session talk persists. There is the housing impasse.**

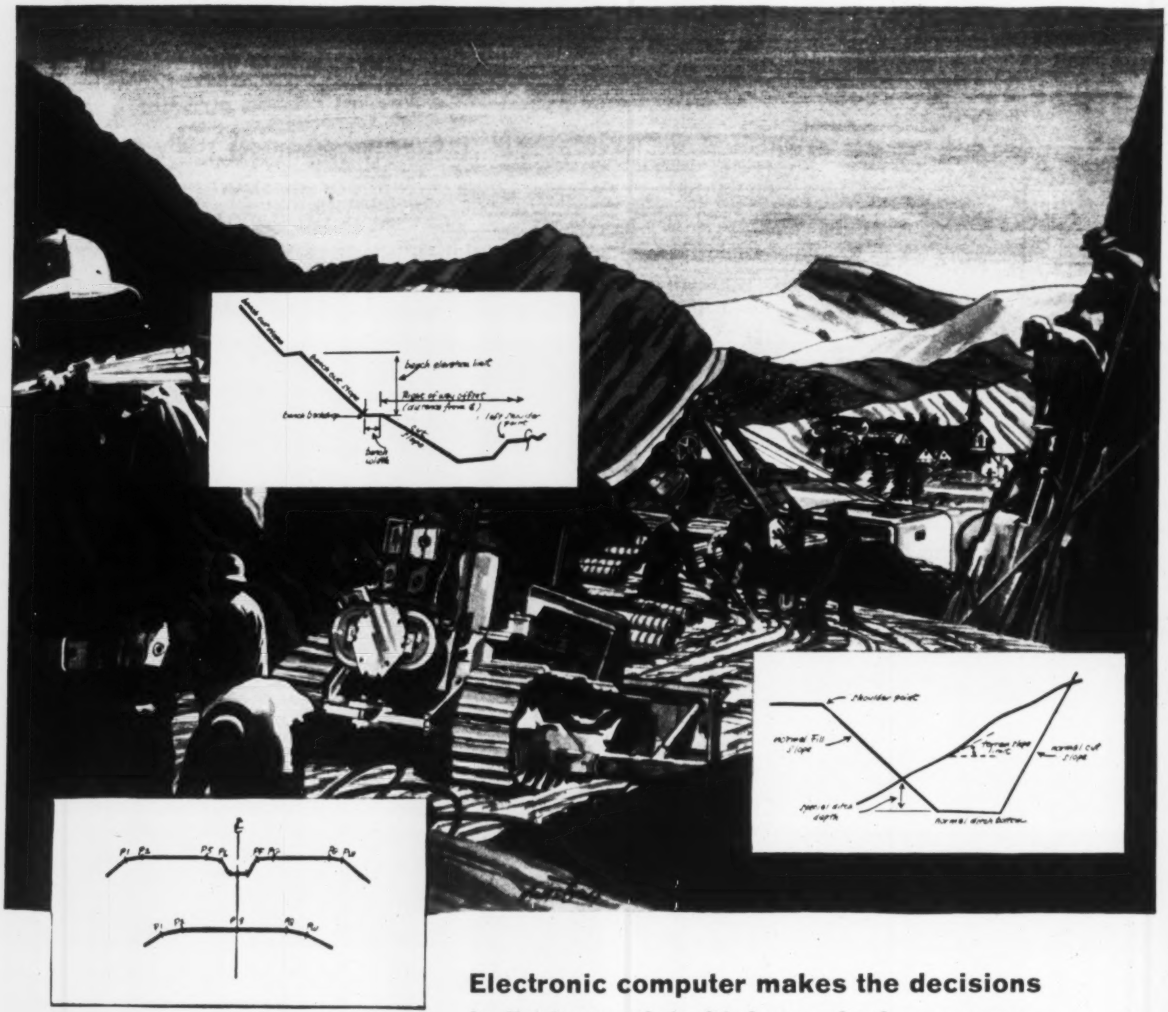
And much special session talk revolves around Democratic refusal to raise the interest ceiling on long-term government bonds, a measure Mr. Eisenhower thinks is absolutely vital.

—

- **A comprehensive inventory of U.S. water resources and their** potential for development will get under way next month. The Senate Special Committee on Water Resources under Chairman Robert S. Kerr (D., Okla.) will hold coast-to-coast field hearings through December.

—

- **Congressional approval of a new military construction money bill gives $1.36 billion to the services for this fiscal year.** The only signficance in the legislation is that Congress is giving the Pentagon, in actuality, only $39 million less than requested.


bench cut slope
bench elevation limit
Right of way offset
(distance from ℄)
bench backslope
bench width
cut slope
left shoulder point
℄
P1 P2 P3 P4 P5 P6
shoulder point
normal fill slope
terrain slope limit
normal cut slope
special ditch depth
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Royal Precision

LGP-30

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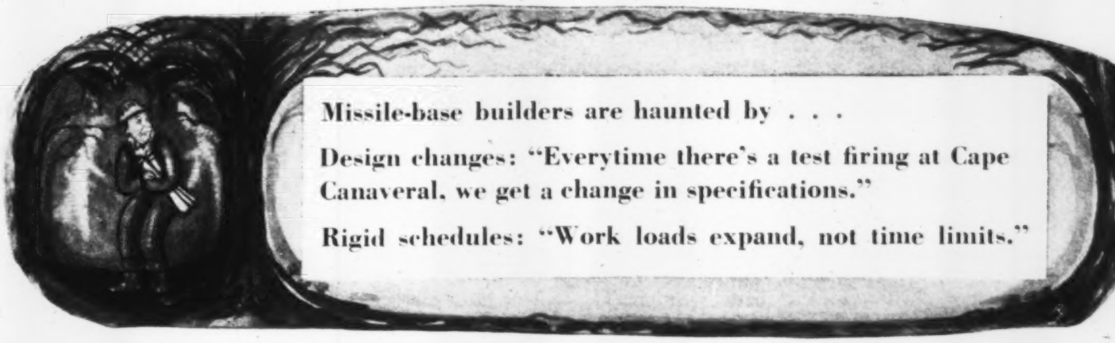
SEPTEMBER 10, 1959

ENGINEERING
NEWS-RECORD



Missile-base builders are haunted by . . .

Design changes: "Everytime there's a test firing at Cape Canaveral, we get a change in specifications."

Rigid schedules: "Work loads expand, not time limits."

Big Contracts—Big Headaches

Building a base for intercontinental ballistic missiles is like going through a revolving door on snowshoes. It's possible, but it demands a great deal of coordination and hard work and there is no backlog of experience to rely on.

The concensus of the contractors working on the five Atlas ICBM bases and the Titan ICBM base now under construction is that any competent general contractor with experience in industrial work can handle missile base projects.

They say the work can be done with standard equipment, it requires no new skills and is unlikely to create any.

But there are some catches. This average competent general contractor must be able to deal with constantly changing specifications, labor disputes, personnel shortages, material scarcities, the supply of remote construction sites, and hard-to-follow plans. He must deal with all of these in the face of an utterly inflexible completion date.

"We're treating these completion dates as sacred," says an official of the Corps of Engineers, the contracting agency for the bases. "Everything is coordinated to a date that is part of a master plan to defend this country. Our main concern is time. There are a lot of changes in plans, but we can't afford to give time. We've got to hang onto it."

John D. Heard, the Defense Department's Assistant Director of Construction, says: "The operational date for each of these bases is as important as the quality of their construction. We're building them for only one reason. They have no economic value."

A base for the 121-ton Atlas missiles consists of launchers, fueling and service facilities, a guidance system, power and water facilities, and operations buildings. The bases have elaborate fueling systems of plumbing and piping that are generally comparable to facilities in refineries and chemical process plants. The ICBM base plumbing must meet surgical standards of cleanliness.

A base for the 90-ft Titan ICBMs has similar facilities, but all are built underground.

Completion dates are sacred

Most of the contractors building these installations say the government's attitude on completion dates is their greatest problem. The necessity of finishing a job on time would bother none of them if it weren't for the frequent changes made in the plans. "Every time there's a test firing at Cape Canaveral, we get a change in specifications," grumbles one project manager.

Changes in specifications are inherent in the Defense Department's approach to the ICBM program. The demands of national defense make it impossible to apply the old step-by-step methods to missile development. Instead, everything is working at the same time toward a coordinated end.

This is known as the concept of concurrency. The department is moving forward simultaneously with all aspects of the program: research, development, testing, production, base construction, crew training and everything else that goes into making a combat-ready weapons system.

Under this concept, the construction of ICBM bases was begun before the first ICBM had even been launched on a test flight. Now, while work on the bases is going on, missile engineers are improving the Titans and the Atlases. The bases under construction must be changed to conform with the new developments in the ICBMs.

"A contract award on a bid basis for an ICBM base is really a permit to negotiate change orders," says one observer. "Even on later missile bases there will be design changes."

The experiences of the Atlas base builders at Warren Air Force Base, Wyo., is an example of this. In the 30-day period of advertising for the initial construction, more than 70 modifications of design were required.

More than 110 changes in specifications have been made and further changes are pending on the George A. Fuller Co. contract to build six Atlas launchers and related structures at Warren. The original contract was for $11.7 million, but changes added another $5 million or $6 million. The final completion date was extended only 30 days.

Blount Bros. Construction Co., which has a contract for nine launchers at Warren, is only about one-third finished, and already specification changes have increased the work 20%. No extensions have been given and more changes are expected.

Missile base builders squeezed between increased work loads and relentlessly approaching completion dates must hire more men, if they can get them, work more overtime, and put on extra shifts. At Lowry AFB, Colo., two 10-hour shifts a day are working to finish the country's first operational Titan base on schedule.

(Turn the page)

". . . Less money will be spent on bases abroad,

Most of the contractors maintain that detailed advance planning and thorough coordination of work can beat the time squeeze. One of them has a traveling expediter whose principal duties are to visit suppliers and make certain that particular items are delivered at sites when they are needed. But changes in specifications often mean changes in materials. The steel strike is making ICBM base work additionally difficult.

"The fact that there is no backlog of ICBM base experience makes the work more difficult," says F. S. McGarvey, project superintendent on the Fuller job at Warren AFB. "We're building the base before we even have the missile in operational form. The plans are hard to follow and there's often quite a bit of discrepancy in the drawings. The fact that the building contractor doesn't know the end function of the facility also makes the construction more difficult."

Plumbing can be 60% of the job

Another problem is the demand for precision. Builders accustomed to working with feet and inches are confronted by plus or minus tolerances of $\frac{1}{64}$th of an inch and smaller. By comparison with conventional construction, the demands are exceptionally precise on beams and anchor bolts. It's like trying to make airplanes out of concrete.

Precision isn't new to the construction industry. There is much of it in power plant construction, for example, but there is 50 years of experience in this field to fall back on.

Most of the ICBM sites are in desolate, out-of-the-way spots. The latest in weapons is committed to one of the oldest military principles—dispersion.

At most bases the missile launchers are built in groups of three and each group of three is necessarily far from any other group of three. As a result, communications are troublesome and costly in time and money.

At Offutt AFB, Neb., where Malan-Grove Construction Co. is building nine Atlas launching facilities at three separate sites, each site is about 50 miles from the firm's Omaha headquarters. The sites are located southwest, northeast and northwest of the city. It takes a day's driving to make the rounds of the three sites. Job coordinating meeting takes two days. Supervisors from two sites come in one day and the supervisor from the third job appears the next.

Malan-Grove's Omaha headquarters keeps in touch with the three sites by radio. Each site has a two-way set and four mobile radio units. Because of the hilly terrain, the mobile units need special antennas.

Because of the comparative isolation of most ICBM bases, the contractors often find it hard to recruit the personnel they want. Conversely, the bases near large cities are often in no better position. The construction industry is so busy in some of these that there is a shortage of construction men.

Missile base contractors predict that as more bases go under construction, it will be harder to find such specialized workmen as heliarc welders, arcolite welders, precision welders, instrument fitters and men experienced in chemical cleaning of pipe.

Unions have been generally cooperative, but ICBM base construction has been the source of several labor troubles. Because of the novelty of the work, most of them have been disputes over work classification.

At Offutt AFB there have been brief walkouts at each of the three Atlas launcher sites. These were attributed to inter-union differences over jurisdiction.

The Fuller job at Warren AFB was delayed by a five-day walkout of local plumbers and steamfitters. They protested against the use of non-union men by one of Fuller's subs working on a special propellant reloading project. Other unions honored the picket line and 500 men stayed out. But the union headquarters in Washington, D. C., stepped in and ordered the Cheyenne local to remove the pickets or face immediate suspension and eventual expulsion.

At Lowry AFB, where the first operational Titan base is under construction, the contractor signed a non-strike contract with the Denver Building Trades Council. This pact assures uninterrupted work and grants the work-

Who's Building the ICBM Bases?

Atlas Bases:	***Prime Contractors:***	***Cost:***
Vandenberg AFB, Calif.		
3 launchers*	Fredericksen, Kasler & Stolte Construction Co., Fontana, Calif.	$9,302,452
3 launchers	Utah Construction Co., San Francisco Paul Hardeman Co., Los Angeles Manhattan Construction Co., Muskogee, Okla.	$5,985,231
Warren AFB, Wyo.		
6 launchers	George A. Fuller Co., New York	$11,774,000
9 launchers	Blount Bros. Construction Co., Montgomery, Ala.	$12,419,000
Offutt AFB, Neb.		
9 launchers	Malan-Grove Construction Co., New York City	$12,870,000
Fairchild AFB, Wash.		
3 launchers	S. Patti Construction Co., Kansas City, Mo. MacDonald Construction Co., St. Louis C. H. Leavell & Co., El Paso Scott Co., Oakland, Calif.	$6,859,000
6 launchers	Blaw-Knox Co. Power Piping & Sprinkler Div., Pittsburgh	$7,132,408
Forbes AFB, Kan.		
3 launchers	Independent Contractors & Engineers, Dallas	$6,462,384
6 launchers	Blaw-Knox Co., Power Piping & Sprinkler Div., Pittsburgh	$6,938,450
Titan bases:		
Lowry AFB, Colo.		
9 launchers	Morrison-Knudsen Co., Inc., Boise Johnson, Drake & Piper, Inc., Minneapolis Paul Hardeman, Inc., Los Angeles Olson Construction Co., Lincoln, Neb. F. E. Young Construction Co., San Diego	$40,668,034
9 launchers	Same joint venture as first nine	$26,944,820

Architect-Engineers: Vandenberg AFB—Holmes & Narver Inc., Los Angeles; Warren AFB—Stearns-Roger Mfg. Co., Denver; Offutt AFB—Black & Veatch, Kansas City, Mo.; Fairchild AFB—Bechtel Corp., Los Angeles; Forbes AFB—Bechtel Corp., Los Angeles; Lowry AFB— Daniel, Mann, Johnson, Mendenhall & Associates, Los Angeles.

** Launchers include supplementary buildings.*

military airports, other conventional installations.”

men wage increases and other contract gains achieved by the unions in the Denver area.

Because of the urgency of base construction, construction men and maintenance personnel frequently work side by side. When pay scales and working agreements differ, friction results.

At one of the Atlas bases a large tower is completely shrouded in canvas. This is no Air Force security measure. It was done to separate the electrical maintenance men on the inside from the construction workers on the outside.

“The missile threat will remain with us for a long time and carry us farther and farther into new and increasingly difficult fields of design and construction,” says Maj. Gen. E. C. Itschner, Chief of Engineers, U. S. Army.

So far the missile threat has carried us into active construction of six ICBM bases that will have a total capacity of 78 missiles—60 Atlases and 18 Titans. The Department of Defense is planning facilities for about nine Atlas squadrons and 11 Titan squadrons. A squadron is made up of 10 ICBMs and the manpower to fire them.

The Atlas has just been declared operational, ready for combat use.

The Titan is scheduled for operational status in late 1960 or early 1961.

The construction aspects of the missile program will change, probably in 1962, when work begins on operational bases for the Minuteman ICBM.

The Minuteman is the Air Force's weapon of the future. It will augment, not replace, the Titans and the Atlases. Its principal attraction is that it will be cheaper to produce and easier to fire. The liquid fuel that powers the Titan and Atlas is responsible for the elaborate forests of piping and valvework that are part of their launching equipment.

The Minuteman will be powered by solid fuel that will probably be loaded into it during its assembly. Its launching facility will be, basically, a hole in the ground. The Minuteman will not only be housed in underground silos, like the Titan, but will be fired from them. (The Titan, which is stored in silos, is elevated to the surface for firing.) That will mean extremely strong silos capable of withstanding the tremendous force of a rocket blast.

The Titan and Atlas bases are presently located in Nebraska, Wyoming, Kansas and Colorado, and on the West Coast. The Minuteman is expected to be scattered throughout the country. Estimates of the number of launchers that will be built for this ICBM range from 500 to 2,600.

The Department of Defense spent about $250 million for ICBM base construction during the past year and about $370 million will go for this work in the coming year. As much as $450 million may be allocated for this work in the fiscal year that begins July 1960.

As the nation places increased reliance on the ICBM, less and less money will be spent on bases abroad, on military airports and other conventional installations.

Of 11 contracts for operational launching sites at six ICBM bases, six are done on joint venture. Joint ventures are entered into to gain profitable combinations of personnel, equipment and offices at or near the site. Also, by pooling experience, equipment and financing, the cooperating companies lessen the risks and hazards of the new construction as well as the possible financial loss.

The long time it takes to complete these missile base jobs is another reason for joint ventures. It can mean that a company has used up its bonding capacity to the limit and, even though it is solvent, ready, willing and able to do work, it cannot bid on a job where a bond (or a willingness to bond) is specified.

The necessity of using a lot of subcontractors gives added importance to coordination demands. At Vandenberg AFB, Fredericksen-Kasler has about 40 subs and some of the subs have subs.

The prime contractor at Offutt AFB, Malan-Grove, functions mainly as a management-coordinating unit. Almost 100% of the work at the base has been subcontracted out to companies from all over the country.

Prime contracts for construction of operational missile bases so far have ranged in value from $5.9 million to $40.6 million (see p. 24). Only six of the 11 jobs have gone to the giants of the construction industry—those winning new contracts last year totaling more than $25 million (ENR Apr. 30, p. 21).

There is room in missile work for medium and even small firms.

For a construction report on two Titan ICBM bases, see pages 34 and 38.

The report above was prepared by Assistant Editor Joseph F. Wilkinson, with the aid of ENR correspondents. Midwest Editor J. Roland Carr and Correspondent Ralph Smith reported on Lowry (p. 34); West Coast Editor Lauress L. Wise reported on Vandenberg (p. 38).

Designing for Easier Maintenance

Careful design and use of durable materials will cut costs of school operation and maintenance, even considering possible higher initial costs, according to a recent seminar of New York and New Jersey school planners and officials.

Constantly growing costs of maintenance and operation already swallow 10% of the national school budget, according to Mr. F. G. Wiedersum, partner of Frederick P. Wiedersum Associates, architects and engineers, New York City, who sponsored the seminar.

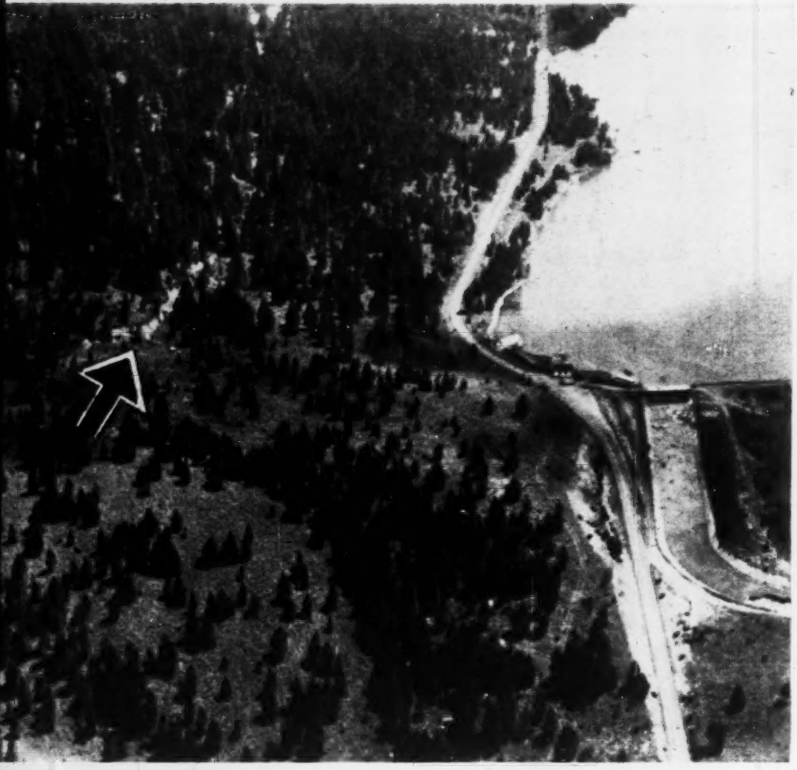
Recommendations for reducing maintenance costs by careful planning during the design stage included:

- **Wall hung plumbing fixtures,** placed back to back on a common wall, will offset the higher initial cost of this type of installation and bring savings in cleaning and floor maintenance.
- **Single-line tempered water supply** in bathrooms will cut down on initial plumbing cost as well as maintenance.
- **Stay away from school-wide air-conditioning systems.** Reasons: Schools aren't usually open during the height of summer heat; and operating costs tend to be high.
- **For heating, use the hot water, oil-fired boiler system** because of comparatively low initial cost combined with the lowest maintenance cost over the long run.
- **Stick to single-story schools.** Within certain physical limitations they're more functional and require less maintenance outlay than multistory construction. But, the group pointed out, when schools are contemplated in highly expensive areas, multistory design may almost be a necessity. This led to the hint that careful site selection can do a lot to reduce initial cost as well as annual maintenance costs. The seminar pointed to site drainage, access roads and available ground space as prime considerations here.

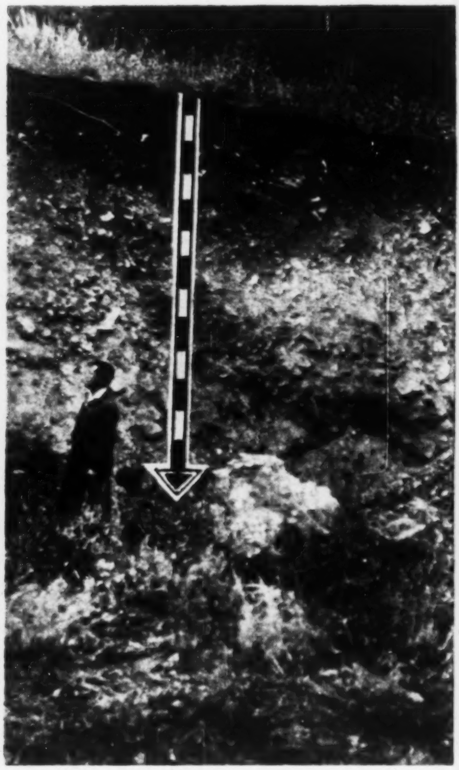
Roofs that are well insulated can pay for themselves in 10 years of fuel savings, the group stated. Designers should work to prevent heat loss with such items as standard double-hung windows instead of full-length units. And this reduces repair costs too, since standard panes allow spot-breakage replacement.

Coming Next Week

You'll find the facts you need on labor costs and trends in the next issue of ENR. It's our third quarterly cost roundup, featuring labor costs. Added attraction: “Construction Costs Around the World.”



1. Fault parallels road about 700 ft from the lakeshore at left. It runs down the north shore of the lake for several miles.



2. Closeup of fault shows vertical displacement. Maximum was 15 to 18 ft.

What the Earthquake Did to

All surface manifestations of the damage suffered by Hebgen Dam in the Montana earthquake of August 18 (ENR Aug. 27, p. 24) indicate that the north shore of the reservoir and the dam site itself were in the area of greatest surface movement.

One of the major faults runs down the north shore of the lake for several miles and passes along the hillside above the dam about 700 ft from the right abutment (picture). Its displacement is nearly vertical, with no appreciable horizontal component. The maximum vertical displacement of the ground surface in the vicinity of the dam was 15 to 18 ft.

By James L. Sherard—Like most construction men, Consultant Sherard, of New York City, was anxious to get full details on the damage done to Hebgen Dam by the recent earthquake. He hopped a plane for Montana and spent several days there. Mr. Sherard recently opened a New York City office for Woodward-Clyde-Sherard and Associates, consulting engineers on soils and foundation engineering.

The surface material through which the fault runs is a well graded, sandy gravel with an excess of silt clay fines (picture 2). The depth to bedrock is not known along this fault line, although bedrock is located a few feet below the streambed at the dam site.

At no location in the vicinity did I find any indication from surface observations how much displacement there may have been in the bedrock to cause the 15-to-18-ft vertical displacement of the soil surface on the hillside near the dam. Some of the geologists now studying the area will probably determine this later.

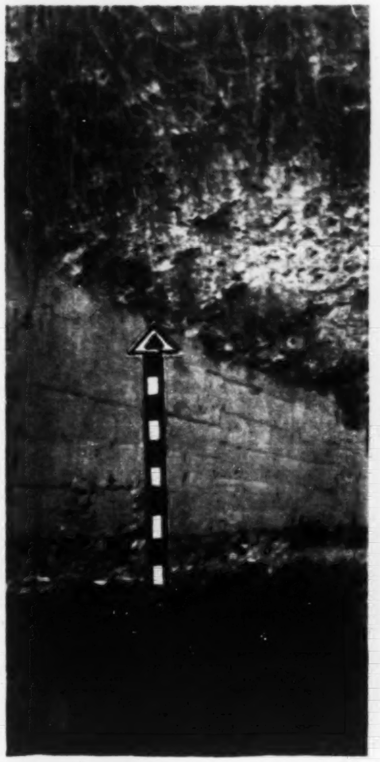
The concrete core wall is not quite as thick as reported earlier. It is about 3 ft thick at the top and, according to old drawings, widens to a maximum width of 16 ft at a depth of 75 ft below the crest. The upstream edge of this concrete wall at the top of the dam is at the upstream edge of the crest of the dam, which is about 20 ft wide altogether. Before the earthquake, the top of the concrete wall was about 4 to 6 in. beneath the surface of the crest of the dam.

As a result of the earthquake shock, the upper portions of the dam embankment, both upstream and downstream from the concrete core wall, settled appreciably.

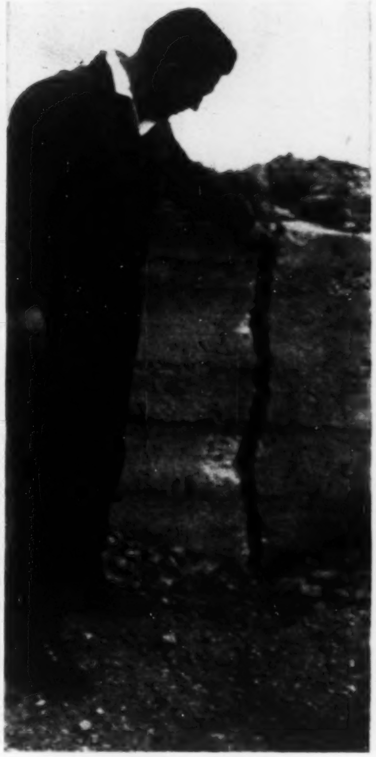
The maximum settlement of the crest of the dam downstream from the concrete core wall was about 4 ft at a point near the right abutment adjacent to the concrete spillway. This embankment crest settlement occurred over the whole length of the dam, but the amount decreased almost linearly with the distance from the right abutment, becoming about 1 ft at the left abutment.

The upstream slope slumped more than the downstream slope—the maximum settlement as measured from the top of the concrete wall is about 6 ft at about the middle of the length of the dam. A thin mantle of earth on top of the concrete wall indicates the former position of the top of the slope (picture 3).

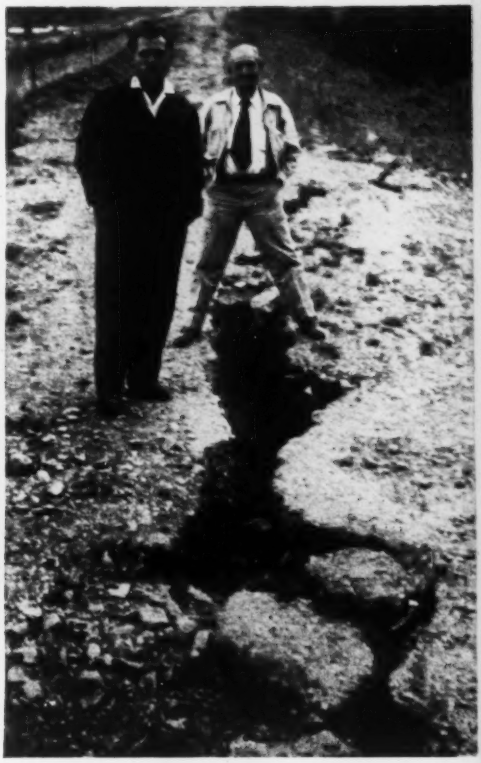
All along the upstream slope there are large, longitudinal cracks of the type commonly seen at the top of the earth slide. Also, there was a 6-in.



3. Earth settled up to 6 ft along core wall, exposing top of the wall.



4. Core wall cracks, about 3 in. wide, developed at right end.



5. Crest cracks were severe. Worst was this crack near spillway.

Hebgen Dam

separation in many places between the concrete wall and the upstream embankment.

Over most of the length of the dam, the top of the concrete core wall exposed by the embankment slumping was in perfect condition. Four vertical cracks, more or less equally spaced over a length of about 85 ft, developed at the extreme right end of the core wall where it joined the spillway structure. The maximum displacement of these cracks is about 3 in. (picture 4).

Old drawings indicate that the concrete core wall is founded on bedrock over most of its length, but may be founded on soil at the right end in the vicinity of the spillway where the cracks occurred.

A number of leaks developed near the abutment contact on the right side in the general vicinity of the cracks in the concrete wall. The seepage water was clear, and not of sufficient volume to cause immediate concern.

The description of the reservoir water washing over the crest of the dam following the first earthquake shocks is particularly interesting. It was a moonlight night and the caretaker rushed to the dam site a few minutes after the first earthquake shock and observed what happened from the high ground above the right abutment. Water had already flowed over the crest of the dam before he arrived. A few minutes later another large wave struck the dam causing water to flow uniformly over the crest with an estimated depth of 3 ft for about 10 minutes.

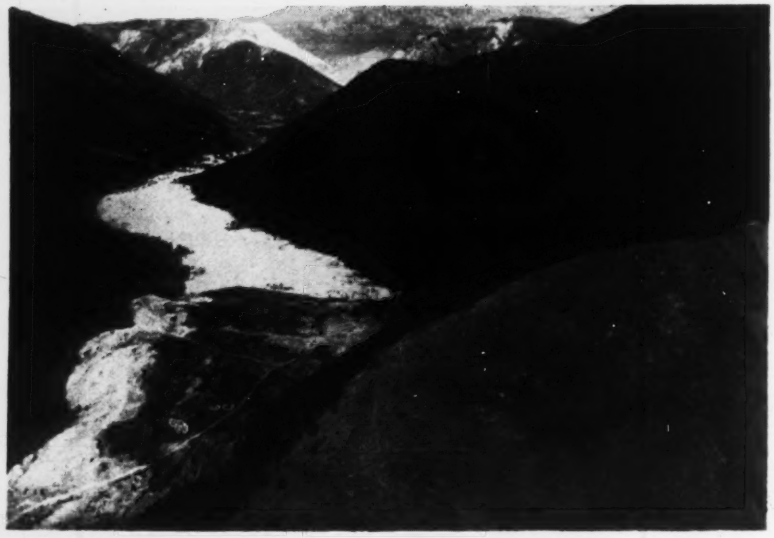
Then the wave receded and seemed to travel to the other end of the reservoir. After about 10 minutes, the wave returned and the water again flowed over the dam with a depth of several feet on the crest for another 10 minutes. Then this wave receded, and 10 minutes later returned again to flow over the dam. The estimates of time and depth of flow of the water over the dam are very rough, but there can be little doubt that water flowed over the crest of the dam at least four times.

The present condition of the downstream slope indicates the embankment was surprisingly resistant to erosion. There is evidence that water flowed over the downstream slope of the dam from abutment to abutment. Much of the grass and small vegetation on the downstream slope was eroded away. However, no severe concentrations of erosion developed which in any way threatened the safety of the dam. The largest erosion gullies were 3 ft deep.

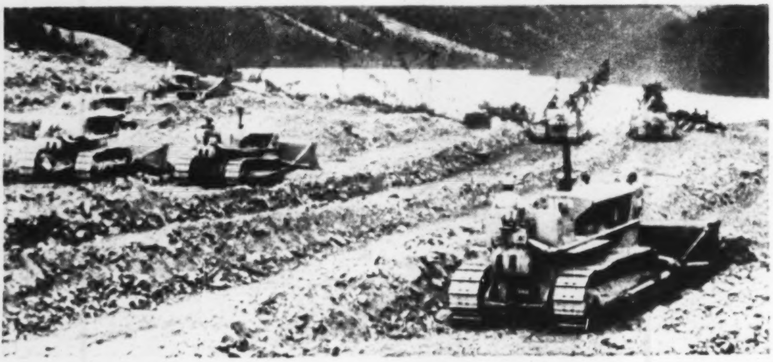
The material exposed everywhere on the surface of the embankment is a gravely clay of medium plasticity. The old drawing shows the dam to have a large downstream rock toe, but there is no evidence visible on the downstream slope that this toe was constructed.

Severe cracking developed on the crest of the dam. The worst of this was at the right end of the dam in the immediate vicinity of the spillway (picture 5). Except at the right end of the dam, where a number of cracks developed on the downstream slope, most of the downstream portion of the dam was free from cracks and no apparent bulging was observed at the toe.

Army Engineers have been working overtime at "Quake Lake" below Hebgen Dam. For the story, turn the page.



Where the slide chokes off the river . . .



. . . Dozers have carved a spillway for . . .

. . . Draining the 'Quake Lake'

Seven miles below damaged Hebgen Dam, a spillway has been cut in the 20-million-cu-yd earth slide that plugged Montana's Madison River when the earthquake hit on August 17.

Lighting was set up last week and a fleet of some 30 dozers worked around the clock moving 500,000 cu yd to cut the spillway that now allows the backed-up waters of the river to pass over the slide material without washing it out.

Army Engineers mobilized contractors' equipment and manpower to dig a 250-ft-wide spillway through the earth dam nature had made. They worked against time as a lake built up behind this "dam"—an 80,000-acre-ft lake capable of bursting out to compound the earthquake damage downstream unless released under controlled conditions. The earth slide the quake caused measured 400 ft high at one end and 200 ft at the other.

The spillway had to be cut and paved with broken rock before the rising new lake overtopped the slide. And the water level was rising at six to nine or more feet per day.

The spillway's depth is 12 to 25 ft with sides sloping up at 1-on-1 from the 250-ft bottom width. This trapezoidal channel, two-thirds of a mile long, was made level for 900 ft, across the slide, then sloped down at 5% grade for 600 ft, then at 10% for another 1,800 ft. It was designed to handle a discharge of 10,000 cu ft per sec at about 3-ft depth and without erosion.

Shovels and trucks supplied the rock for paving the spillway cut. The dozers placed it in a 5-to-10-ft layer.

Maj. Gen. Keith R. Barney, Missouri River Division Engineer, was on the job for the Corps of Engineers. The Montana Chapter of the Associated General Contractors helped mobilize the needed equipment. A Peter Kiewit Sons Co. bulldozer came across Idaho to Montana with police escort, so serious was the need for equipment to rush the job.

Re-creating History

Mardi Gras, frontier towns to rise again—in Bronx

Little Old New York, San Francisco's Barbary Coast, western ghost towns, and New Orleans' Mardi Gras—all will rise again, side by side, in a former swampland in the Bronx, New York City's northernmost borough. Construction has begun there on the world's largest outdoor family entertainment center.

The $65-million project, called Freedomland, U.S.A., will cover 205 acres. It will be built in the shape of the U. S. with installations spotted in their respective states.

Constructors are moving more than a million cubic yards of earth to recreate villages, roads and parks. There will be more than eight miles of rivers, lakes and streams, half-a-million yards of paving.

The center will have 41 theme installations, each re-creating phases of American history in elaborate detail—plus some peeks into the future.

Every installation will be solid in construction and built to last 50 years, according to the builder.

Among the attractions will be industrial and product exhibits.

The center is designed for a peak daily attendance of 90,000 persons. It will have parking facilities for 12,000 cars, and restaurants and snack bars. Roadways, walkways, rain shelters, and rest rooms are designed to accommodate 32,000 persons at any given time.

Marco Design Inc., Los Angeles, are the architects. Cabot, Cabot and Forbes of Boston are the engineers. General contractors are Turner Construction Co., New York City, and Aberthaw Construction Co., Boston. International Recreation Inc., Boston, is the owner. It's a publicly held corporation; Webb & Knapp, New York City, owns 40% of the stock.

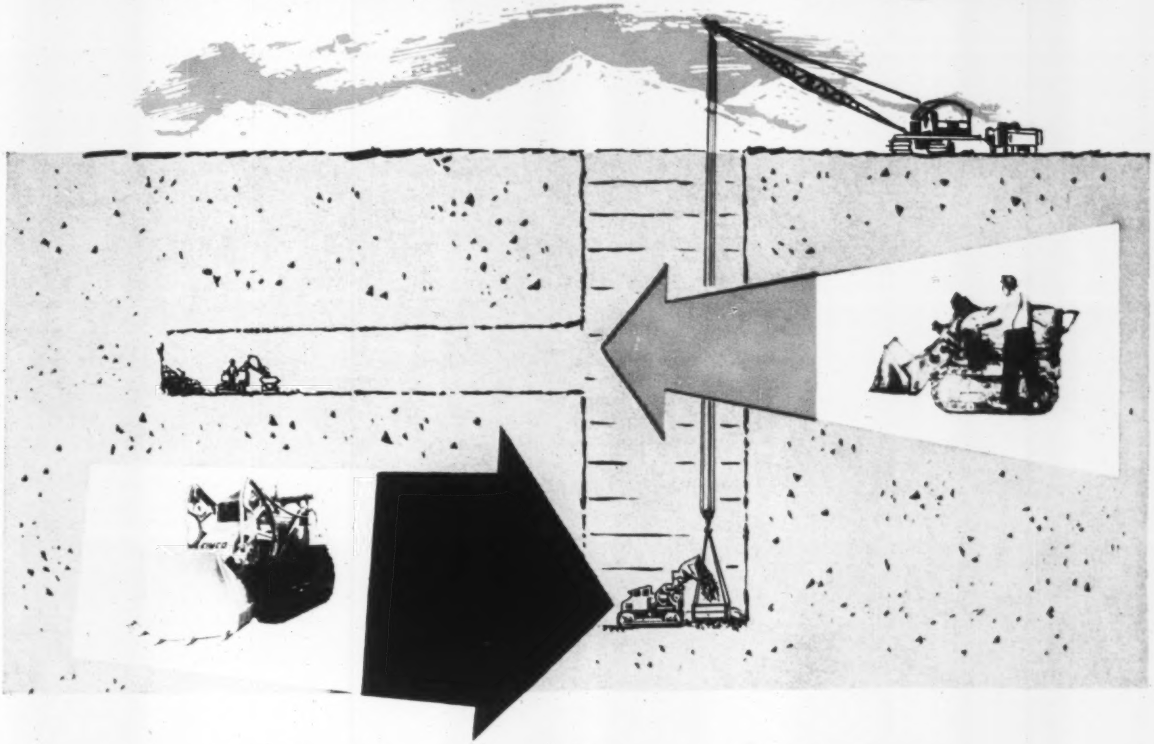
Aluminum Company Plans Three New Buildings

Reynolds Metals Co. will build three new structures at its Richmond, Va., headquarters starting next year.

Included in the program will be a research center, a products display building and another office building. Marcellus Wright & Son and Baskervil & Son, both Richmond firms, will design the buildings.

Construction will start as soon as plans are completed early next year. Cost figures for the project were not released, but the present headquarters, totaling nearly 294,000 sq ft and finished last year, came to $11.5 million. The additions will be nearly as extensive.

Economical, Efficient Construction of Missile Base and Launching Sites



On-The-Job Proven Solutions with the Eimco 105 and 630 Lines of Loaders

As the nation undertakes the building of underground ballistic missile complexes, American industry and ingenuity has already made available the specialized equipment necessary, and proven their efficiency in use.

Private enterprise has had to strive for utmost efficiency for low cost and large output in tunneling and excavating, both vertically and horizontally. Thus, when A. J. Cheff Construction Company won the subcontract for underground tunneling and shafts involved in the sinking of the Swift Creek 55 foot circular spillway and control shaft, they turned to a modern Eimco 105 Crawler-Tractor Excavator to do the job. The shaft was sunk to a depth of 950 feet, using one 105 excavator for all loadings of broken material from the shaft bottom.

The machine was lowered to the bottom onto the newly-blasted rock by an 80 ton mobile crane. The same crane was then used to lower and, after loading, hoist, a truck dump bed. Broken material was loaded on the shaft bottom by the Eimco 105, digging its way into the broken rock. Upon being hoisted, the dump bed load was dumped by swinging it into position over a Euclid truck, the "tag" line of the crane being used for dumping.

In shale, an Eimco 105 specially engineered short-coupled dozer with ripper attachment has been successfully used and in underground rooms, the excavator loads directly into a truck bed, carried on a flat-rack truck. Even in such tough assignments, the Eimco 105 excavator, which is diesel powered, showed a mucking rate as high as 125 cubic yards per hour!

In tighter areas, Eimco's famous 630 underground mining excavator, running on compressed air or AC or DC current, has proven its capabilities all over the world. With a production rate of 40 cubic yards per hour for the 630, production with either of these machines is limited only by the hoisting capacity available. The Eimco 126 Front End Loader has also proven itself as an efficient tunneling unit.

Thus, the combination of Eimco engineering and production knowledge and progressive construction company practices, has developed proven-on-the-job solutions to economical construction of intricate ballistic missile complexes and similar projects. For further facts, data and courteous, qualified consultation, write The Eimco Corporation, P. O. Box 300, Salt Lake City 10, Utah.

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Putting the Laurel to bed

That's The Laurel Pipe Line! *Recently completed, this 440-mile line is the first to use 24-inch-diameter pipe in a major cross-country refined products system.*

Gasoline and other petroleum products will be transported through the line from Delaware River Valley refining centers to inland marketing areas such as Reading, Harrisburg, Pittsburgh and Cleveland.

National Tube supplied the pipe for the Laurel Line—approximately 66,000 tons of USS National Seamless and Electric Weld Line Pipe in sizes 24" O.D. to 14" O.D. for the main line and 9,000 tons for feeder lines, take-offs, and terminal facilities.

The eastern section of the main line, some 135 miles, is 24" diameter, API 5L X-52 pipe, ranging from .281 to .375-inch wall thickness. Initially, the line's throughput is expected to be about 100,000 barrels a day; however, this can be increased to 300,000 barrels with additional pumping stations. This line will make a greater variety of refined products available, in increased quantities, at a considerably lower transportation cost.

The Laurel Pipe Line represents another first for USS National Line Pipe. Why is USS National consistently chosen for rugged line pipe assignments? The answer in a word: *Performance.* You see, National Line Pipe combines the qualities of strength and dependability to give you a better product. Remember, too, that National Line Pipe is available in a complete range of wall thicknesses, steel analyses and in diameters up to 26 inches in Seamless and up to 36 inches in Electric Weld. For more information, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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National Tube Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

Roads: What the States Would Get

	FY 1961 millions	FY 1962 millions
Total	$1,800	$2,000
Ala.	35.5	39.4
Ariz.	24.6	27.3
Ark.	17.9	19.9
Calif.	182.9	203.2
Colo.	13.9	15.5
Conn.	22.0	24.4
Del.	6.3	7.0
Fla.	46.6	51.8
Ga.	43.4	48.3
Idaho	12.4	13.8
Ill.	92.3	102.5
Ind.	51.9	57.7
Iowa	17.1	19.0
Kan.	16.1	17.9
Ky.	31.6	35.2
La.	47.5	52.8
Me.	9.3	10.3
Md.	40.6	45.1
Mass.	50.1	55.7
Mich.	70.7	78.6
Minn.	33.9	37.7
Miss.	19.8	22.0
Mo.	51.4	57.1
Mont.	20.5	22.7
Neb.	11.1	12.3
Nev.	9.4	10.5
N. H.	9.9	11.0
N. J.	58.2	64.7
N. M.	21.6	24.0
N. Y.	89.2	99.0
N. C.	9.8	10.8
N. D.	8.0	8.9
Ohio	117.2	130.3
Okla.	16.4	18.2
Ore.	31.2	34.7
Pa.	73.4	81.5
R. I.	8.4	9.3
S. C.	14.8	16.5
S. D.	7.6	8.5
Tenn.	53.4	59.3
Tex.	81.3	90.3
Utah	16.8	18.7
Vt.	17.0	18.9
Va.	76.3	84.7
Wash.	32.6	36.2
W. Va.	22.6	25.1
Wis.	19.0	21.1
Wyo.	18.7	20.8
D. C.	17.8	19.8

House Bill: 19% Less for Roads

Forty-eight states will split up $1.8 billion of federal money for the Interstate Highway Program for fiscal 1961, $2 billion for fiscal '62 (see table) if the Senate approves the financing bill passed by the House last week.

But there have been rumbles of discontent with the House version and talk of plans to circumvent it.

Not much trouble is expected from the Administration, which has indicated it will compromise with Congress on a higher tax plus diverted revenues to solve the financing puzzle.

The House bill calls for a one-cent-per-gallon increase in the federal gasoline tax, starting when the bill becomes law and running to June 30, 1961. That is expected to bring in $960 million. President Eisenhower had asked for a 1½-cent increase, and Congress had wanted none.

Also, a total of $2.5 billion of vehicle excise taxes that have been going into the General Fund would be diverted to the Highway Trust Fund over three years starting in 1961. The President wanted none of this; Congress at times talked of diverting all of the excise revenues.

So after all the political maneuvering in and out of Congress, each state would get 28% less than it would have under the $2.5-billion authorization previously set for fiscal 1961; 9% less than under the $2.2 billion planned for fiscal 1962—a 19% cut for the two years.

While waiting for Congress to make up its mind on a financing solution, the states have been halting new highway starts and cutting back.

They feared going ahead with contract advertising or contract letting as long as there was doubt about getting money from the U. S.

Even if the reduced apportionments pass the Senate and flow into state coffers immediately, it will be too late to undo the damage done to the contract awards totals in northern states.

Concrete Arches Fall At Portugal Steel Mill

Three precast concrete arches, spanning 49 ft atop 46-ft-high walls of Portugal's first steel mill, crashed just 10 days after erection, killing 10 workers and injuring 12 others.

The accident occurred 10 miles south of Lisbon where Siderurgia Nacional is building a $98-million steel producing complex for the Portuguese government.

Postal Laboratory to Speed Bay Area Mail Service

A postal laboratory that will process mail and serve as a testing ground for new postal devices will be constructed at Oakland, Calif.

The fully mechanized post office, called "Project Gateway," will speed incoming and outgoing mails for the entire San Francisco Bay area and cities and towns in adjacent districts.

As a test center, it will help the Post Office Department find ways to get mail in and out of major post offices more efficiently and economically.

The large, industrial-type mail handling structure will be designed by the Food Machinery and Chemical Corp., San Jose, Calif., within a year. The company is now studying types of building and mechanized equipment and devices. A report on the findings will be made to the Post Office Department within 90 days. Final cost of the facility will not be known until recommendations are completed.

Food Machinery then will complete the design and fabrication of all mechanical equipment and develop architectural plans.

The facility will be located on a 20-acre site at the base of a large area designated by the municipal government of Oakland for urban development.

The completed project will be built and owned by private investors after public construction bids.

The West Coast development, "Project Gateway," follows by less than a year the announcement of a similar contract award to the International Telephone and Telegraph Corp. to build an experimental post office in Providence, R. I., called "Project Turnkey" (ENR Feb. 12, p. 27).

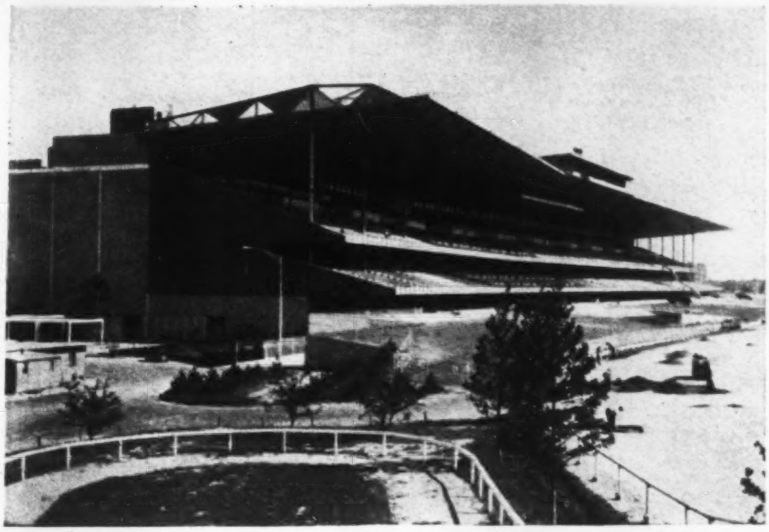
$100-Million Food Center Opens on 388-Acre Site

Philadelphia's $100-million food distribution center is now in use.

For generations much of the food distribution business in the Greater Philadelphia area was concentrated in Dock Street, a crooked winding street lined with buildings that in some cases date back to colonial times.

The 75 produce and seafood merchants who formerly operated in the old Dock St. area are now operating in a new 388-acre facility. They are housed in two produce buildings and in a seafood market.

Additional large-scale building projects are under way or will soon start. Fifteen firms have commitments to build. Future projects include a $7.5-million commissary and bakery, a $2-million warehouse, $1-million banana ripening and processing building and a $250,000 tomato-ripening building.



New Aqueduct Race Track Opens

Race fans will return to Aqueduct Race Track in New York City next week after a three-year wait. Completely rebuilt, the new $33-million complex centers around the 20,000-seat grandstand shown above. The grandstand is 1,050 ft long and 110 ft high. It is covered by a cantilevered, truss-supported steel deck roof. Roof trusses were shop welded in two sections: an 80-ft-long anchor arm and a 55-ft-long cantilever. More than 8,500 tons of steel went into the grandstand-clubhouse frame.

Arthur Froehlich & Assocs., Philadelphia, is the architect. Stone & Webster, Inc., New York City, are the engineers.

A $30-million development combining office, commercial and residential structures will rise on a three-square-block area along Los Angeles' Wilshire Blvd.

The five main buildings in the project are tentatively scheduled for construction beginning early next year.

The buildings will occupy only 26% of the land, to make room for parks, swimming pools and other recreation areas within the development. Underground three-level garage space for 3,400 cars will be provided.

A 16-story, 340-room hotel will be at one end of the development. Adjacent to it will be a 22-story office building. Plans also include two apartment buildings—one a 22-story rental building, the other a 12-story cooperative. All commercial enterprises will be concentrated in a single-story building located in the center of the project.

Pedestrian bridges will span the two streets within the area and connect all buildings.

The center is being financed by a group of investors headed by George W. Warnecke, of New York City. Charles Luckman Associates, planning-architecture-engineering firm of Los Angeles and New York, has been retained to design the five main buildings of the project.

The land is bounded by Wilshire Blvd. on the north, 8th St. on the south, Rimpau Blvd. on the east and Tremaine St. on the west.

Congress Delays Lake Michigan Diversion

All hope for approval this year of additional diversion of water from Lake Michigan through the Chicago Drainage Canal was ended last week when the Senate pigeon-holed the necessary legislation.

The measure up for Senate debate had already passed the House. It calls for diversion of another 1,000 cu ft of water per second through the Chicago Drainage Canal for one year while the Public Health Service makes a study of the effect of this on the city's sewage disposal system.

By referring the legislation to the Senate Foreign Relations Committee for further study, the Senate by a 54-31 vote guaranteed that nothing can be done legislatively at least until next spring.

Canadians have protested strongly that the unilateral decision to increase the present 1,500 cfs diversion would be a violation of treaty obligations, and other opponents have said that shipping and power production on the Niagara and St. Lawrence rivers would suffer.

Around the Country . . .

- **Not enough bargaining**—The General Accounting Office claims the Air Force hasn't pushed hard enough for lower prices on the bulk of housing projects it has purchased for its personnel. GAO, Congress' auditing agency, says windfall profits totaling $470,000 may have gone to at least three housing project owners. The survey covers 33 Wherry projects bought since June, 1958.

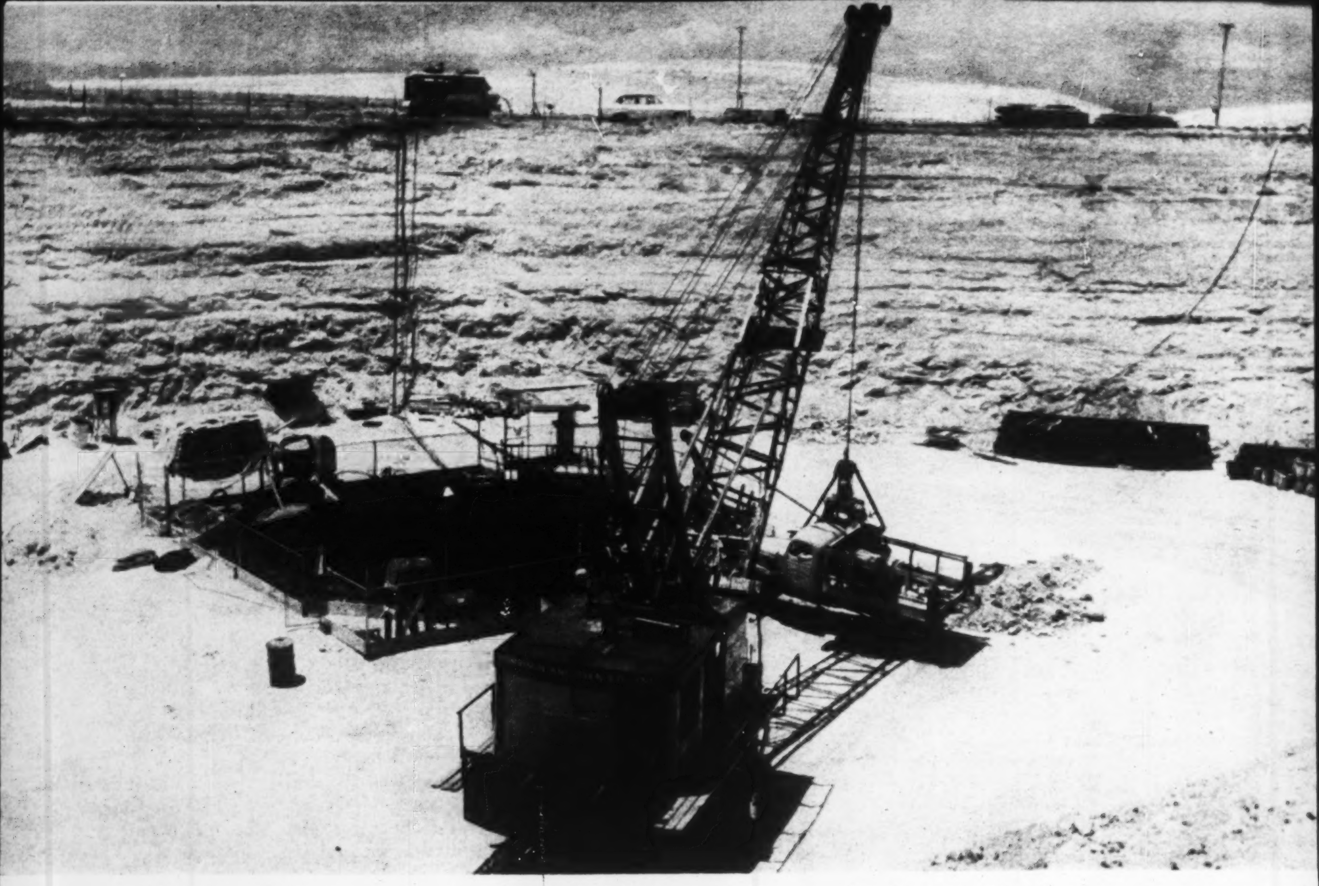
- **Pollution control**—Bills approved by the Senate and House to continue the air-pollution control program are headed for a conference committee. The House bill simply extends the present law for another two years. The Senate bill extends the program for four years and boosts federal outlays from the present $5 million a year to $7.5 million.

- **Bridge called safe**—The suspension bridge over the St. Lawrence River's south channel, below the international power dam at Massena, N. Y., has had its structural soundness reconfirmed. A board of consultants examined the bridge after a former inspector for Canada's St. Lawrence Seaway Authority brought court action to close it as "unsafe."

- **Powerhouse coming**—The Virginia Electric & Power Co. will build a $30.5-million addition to its Portsmouth plant—the third addition since the station was constructed after World War II.

- **For the tired housewife**—Shoppers in Tacoma, Wash., may be transported up and down a steep hillside in the business district by four moving stairways. The City Council has authorized architects Lea, Pearson & Richards to obtain costs of acquiring property. The project may require demolition of buildings to make way for the moving stairways, which would also move through portions of other buildings. Voters approved an $800,000 bond issue for the project last year.

- **Omaha building**—Three firms have joined to build a 12-story, $4-million building in Omaha, Neb. The companies are contractor Peter Kiewit Sons Co.; consulting engineers Henningson, Durham & Richardson; and the advertising firm of Bozell & Jacobs. First stage of the development will include the office building and a parking garage, with an adjoining building and additional parking decks planned as a later addition.



Missile silo shafts that will extend 165 ft below ground are sunk after overburden is removed.

The Titan ICBM Base: Building

Contractors are digging a hole and pulling it in after them to construct the nation's first underground missile base, at Lowry Air Force Base near Denver.

The installation, scattered over 875 sq miles of sage brush and buffalo grass, is for the 110-ton Titan intercontinental ballistic missile. This two-stage, liquid-fueled ICBM is over 90 ft long and has a range of more than 6,300 miles. It is the nation's most sophisticated weapon in being.

Lowry AFB will be the first operational Titan base. The one at Vandenberg AFB is primarily for training; those at Rapid City, S. D., and Mountain Home, Idaho, are yet to come. Lowry's 18 missiles make it second only to the 24-missile Atlas base near Cheyenne, Wyo., as the free world's largest ICBM installation. The construction cost will be $100 million, exclusive of missiles and ground support equipment.

The Lowry base is the U.S.'s only completely hard (underground) base.

In this, it contrasts with the operational missile bases being constructed elsewhere. They are all Atlas bases and range from soft, with no protection at all, through varying degrees of protection—dispersion, earthen bulwarks and partial burial—to semi-hard. None is completely below ground. Lowry is. When the base is finished, the only thing above the surface will be a building for a guard at the gate.

• Safest place on earth—In the event of a missile attack, Lowry's underground fortresses could well be the safest places on earth. Their occupants will be protected overhead by at least 20 ft of earth or by concrete hatches, flush with the ground and up to 5 ft thick. Massive doors at every turn underground will protect against blast.

The whole will be hermetically sealed off. Air filtration equipment will make it independent of outside—possibly radioactive—air.

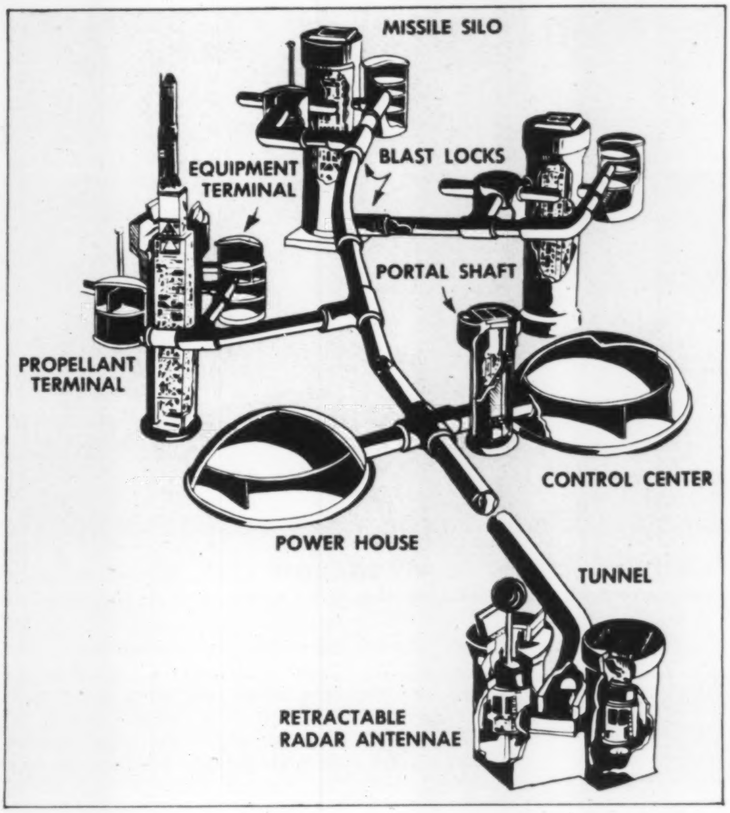
Techniques developed by the Navy for its battleships will be modified and adapted to spring-mount the underground structures and equipment to enable them to withstand shock of 50 times the force of gravity.

In the event of a nuclear Pearl Harbor, the men in the underground fortresses stand to survive to hurl their awesome weapons. The certainty of retaliation is a formidable safeguard.

• Six underground fortresses—The Denver base is not one underground fortress but six. Following the don't-put-your-eggs-in-one-basket doctrine, the installation is divided into six complexes of three missiles each. The individual complexes, located on the Lowry bombing range southeast of Denver, are spaced at intervals of 5 to 35 miles.

Although each represents but one-sixth of the total, the individual complexes are impressive. The key to each is the three silos that will house the Titans. The silos are 40 ft in diameter and go 165 ft into the ground.

Each complex has a powerhouse and control center. Both are shaped like the broad end of an egg. The 100-ft-dia powerhouse is 45 ft high. Its dome-shaped curve is on a 60-ft radius, which gives the egg effect. The arch of the control center is slightly flatter. At the opposite end of the complex site from the missiles are two more silos, 27 ft dia



Here's the launcher complex for three Titan ICBMs.

from the Ground Down

by 65 ft deep. They contain the radar antennae that raise and lower like submarine periscopes.

Adjacent to the missile silos are two vertical cylinders deep in the earth. One—37.5 ft in diameter by 37 ft high—is the propellant terminal, which stores the liquid oxygen, nitrogen, and helium that pressurize and power the missile. The other—40 ft dia by 60 ft deep—is the equipment terminal.

The whole is interconnected by a maze of tunnels that totals more than 2,000 ft. Personnel tunnels are 9.5 ft dia; ventilation tunnels, 5 ft dia; and the fuel tunnels, 12 ft dia. At tunnel junctures and strategic spots elsewhere are blast locks of very heavy concrete, equipped with massive blast doors. Access is by a portal silo, located near the control center. The size of the plot of the complex is about 900 × 1,600 ft.

• Two big contracts—Building a base of these proportions is a major construction job. Two contracts totaling $67.5 million for construction of all six complexes are held by Morrison-Knudsen Co., Inc. and Associates.

The first contract, awarded last April for the first three complexes, totaled $40.6 million (ENR April 23, p. 25). It was $800,000 lower than the next bid. The second contract, for the other three complexes, was awarded in June on M-K's low bid of $26.9 million. The next lowest bid was $27.4 million, and the government's estimate was $28.5 million.

The first contract contains several million dollars worth of so-called standardized equipment for the second contract, which accounts for the difference in their amounts.

Most of the construction is being performed on a lump sum basis. Here are some over-all figures of representative contract costs—without installed operating equipment—of major units:

Missile silos cost from $660,000 to $730,000 each. Other lump sum costs include: equipment terminal, $310,000 to $350,000; propellant terminal, $325,000 to $370,000; and antenna silo, $150,000. Getting into larger figures, each powerhouse will cost about $1.1 million for construction and will contain about $1.1 million worth of so-called standardized equipment—powerhouse and terminal equipment including pumps. A portal silo to serve the powerhouse will cost about $250,000. And each of the six control centers will cost about $480,000 to construct.

At each of the six complexes, there will be about $700,000 worth of utility and personnel tunnel construction, and nearly $250,000 worth of fuel tunnels.

Although construction quantities are no yardstick of the immensity of the task at hand, major items are impressive. To mention a few:

The six complexes involve a total of 4 million cu yd of excavation.

There will be 200,000 cu yd of concrete, 2,000 tons of 6-in. structural ring beams in the silos; 10,000 tons of other structural steel; 10,000 tons of metal plate tunnel liner; 23,000 tons of steel pipe and fittings, etc.

There will also be 3.5 million lb of stainless steel pipe and fittings, and tank liner plate.

The dollar value of the two contracts scarcely gives the idea of what the job involves. It represents military construction's new look in that it combines mass and delicacy to a degree unusual in contracting work. On the one hand, the job is so big that Morrison-Knudsen is preparing to use a light plane to take executives from site to site. As it is, management must drive 170 miles to hit all job locales.

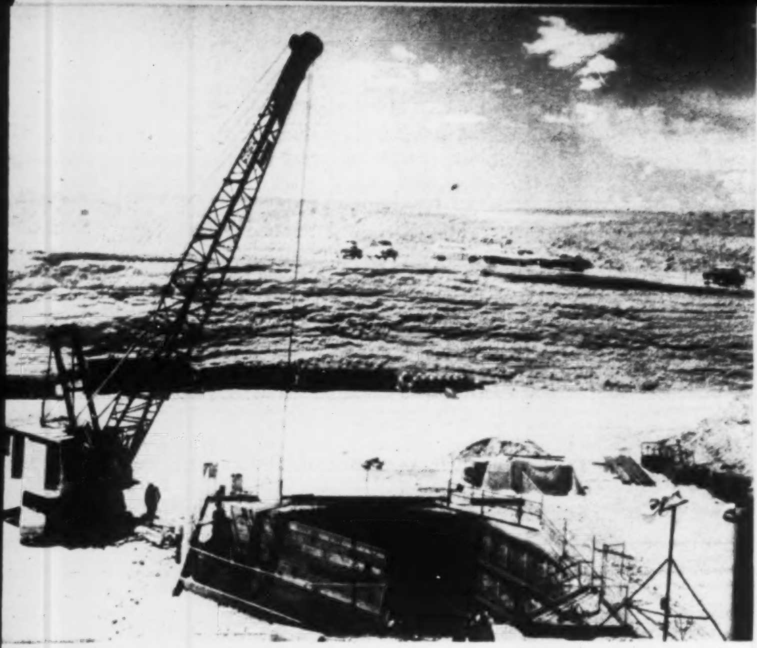
At the other extreme is the deftness required in carrying out the work. Some of the beams have to be fitted to a plus or minus tolerance of $\frac{1}{64}$ in. In this same category is the cleanliness requirement for the propellant system, which bars any foreign particle bigger than 150 microns (.0059055 in.). (See also "For Missile Bases: Antiseptic Contractors" ENR July 2, p. 34, which detailed these cleanliness requirements.)

• The excavation—In taking on the underground project, M-K tackled it as a scraper job. The site is being opened up, then the structures will be built in place and backfilled.

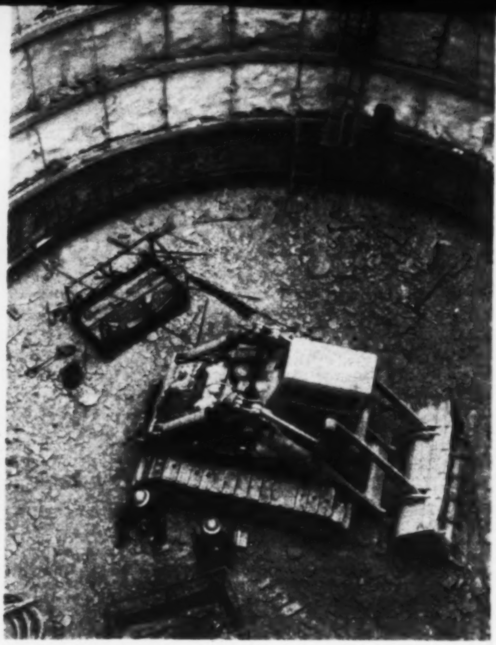
The excavation goes down to the base of the powerhouse and control center and to about the crown of the tunnels. Thereafter, an additional 100,000 cu yd of excavation will be required. The tunnels will be trenched out with scrapers.

Excavation at the tunnel junctures for the blast locks, which go considerably deeper, will be by clamming. The various silos will be carried on downward by sinking shafts.

Some of the sites are located on what used to be a bombing range for Lowry AFB. The area is littered with live duds buried just below the surface, so no blasting is permitted. But excavation goes quite rapidly because of a heavy



CLAMMING OPERATIONS must be done behind a bang-board to protect tractor shovel operators working at the bottom of the pit.



SAFETY MEASURES include protected ladders and a high-capacity blower to force fresh air into shaft bottoms.

concentration of equipment and favorable soil conditions. A tight schedule and the desirability of getting as much concrete in place as possible before cold weather prompts M-K to wrap up the excavation work in a hurry.

About two million cu yd of open-cut excavation at four complexes is being performed by the Hopkins Construction Co., Denver, under a subcontract. One big spread on this work includes eleven 18- to 24-cu-yd earthmoving scrapers. Four crawler tractors operate as push-dozers, both to load and to help boost the scrapers up the steep ramps. Two others are equipped with rippers.

This outfit moves an average of 32,000 cu yd in two 10-hr shifts per day, on an average haul of 1,200 ft.

A second Hopkins' earthmoving spread includes five 14-cu-yd and two 18-cu-yd scrapers, plus one ripper and two dozers. M-K's earthmoving outfit includes six 18-cu-yd scrapers and five crawler tractors as dozers or rippers.

The soil abetted the accomplishments of these fleets of earthmovers. While it has a wide range of makeup, most of it is easily handled. Some sand strata were found in which cementation had occurred, but most of it broke up under the weight of the heavy machinery. Rippers on the crawler tractors took care of the rest.

The soil, despite its diverse components, has a steep angle of repose. It stands quite firmly on a ½ on 1 slope, which substantially reduced the amount of overburden that had to be handled. Scraper excavation at a typical complex totals 530,000 cu yd. Less than one-half of this represents cubage that will be occupied by the structures.

In doing the excavation, design necessity is turned into construction advantage. The tunnel trenches connecting the areas of major excavation became haul roads to set up a traffic pattern so that such a large fleet in so small an area could ramp in and ramp out without snarling or delay.

Work is carried out with the aid of a safety barrier, or bang board, made of timber and steel beams. The barrier is progressively fastened to the ring beams as work moves downward. It divides the tunnel into two vertical cells. Personnel work on one side of the bang board while overhead activity, such as clamming, goes on at the other.

• Coordinated construction—Since time is important, the contractor is constructing all six complexes at the same time. They are in various stages of completion. Consequently, work schedules have been developed that require only four equipment spreads to handle construction of the 18 missile silos at the six complexes.

In general, one spread consists of a crawler crane with 2½-cu-yd clamshell aided by a small tractor shovel working in the hole; a 25-ton truck crane that sets ring beams and handles other materials; an 800 cfm air compressor; air spades and a pneumatic concrete machine. A 3-in. air line extends down into the silo excavation to a manifold with four or five ¾-in. air hoses.

Two silos in a complex are excavated, braced and lined with pneumatically placed concrete at the same time. When the clamshell has removed enough excavation in one silo to permit placing the next ring beam, it moves over to the other silo and resumes work. In the meantime, workmen insert one or two ring beams that are spaced from 5 ft to 2.5 ft c-c. Two-inch wire mesh is inserted behind the rings and backed up with 2x6-in. or 2x8-in. vertical timbers wedged in place.

The wire mesh is then covered with 2-in. minimum of pneumatically placed concrete to hold things secure until structural concrete can be placed. The concrete wall of the silo, which varies in thickness from 2 ft at the bottom to nearly 10 ft at the top, is then constructed, embedding the ring beams. The 165-ft-deep silos will have 7-ft-thick reinforced concrete bottom plugs.

• Safety features—Each silo construction site is enclosed by a sturdy, woven wire fence on iron posts. In addition to the bang boards that protect workmen in the hole during clamming operations, other safety precautions include vertical guardage ladders welded to the ring beams and enclosed with guardrail, with platforms located every 20 ft for workmen's access to the hole.

Fresh air is assured by a 24-in. flexible tube and a high capacity blower that forces air down to the bottom of each silo excavation.

Concreting will be from a central batching plant strategically placed to serve four sites. The concrete materials will be dry-batched, trucked to the construction sites, and mixed in two or three 34-E pavers for lowering by bucket and crane into the shafts.

The 150-ton batching plant—last used by M-K at Wishon Dam in California (ENR Aug. 29, 1957, p. 38)—at top speed can batch sand, gravel and cement for 90 cu yd of concrete per hour. Cement will be stored in silos at the plant. Aggregates will be moved from stockpiles by a 3-yd tractor shovel, charged into a hopper just above ground level, and elevated by bucket conveyor to bins above the weighing device.

• **Intricate forming**—While the forming for the silo shaft concrete—2.5 ft thick for most of its depth—promises to be routine, that for the powerhouse and control center shapes up as something else. Forming will be done with plywood. The spherical shape of the domes, with their changing arcs, indicates gore-shaped panels small in individual size, impressive in number and extremely cute in the fitting.

The job is under such a tight schedule—730 calendar days—that most of the operations must go on simultaneously, rather than successively. While M-K hopes to reuse the forms three times, there will not be too much leapfrogging in this, or any of the other aspects of the project.

• **Shock-proof construction**—The second floor of the control center has no connection with the dome. Instead, 1 ft of clear area is left all the way around for rattle space as a shock precaution. Support columns do not have solid footings; they are mounted at midpoint on beams that themselves are elevated. The midpoint suspension permits a spring action against shock.

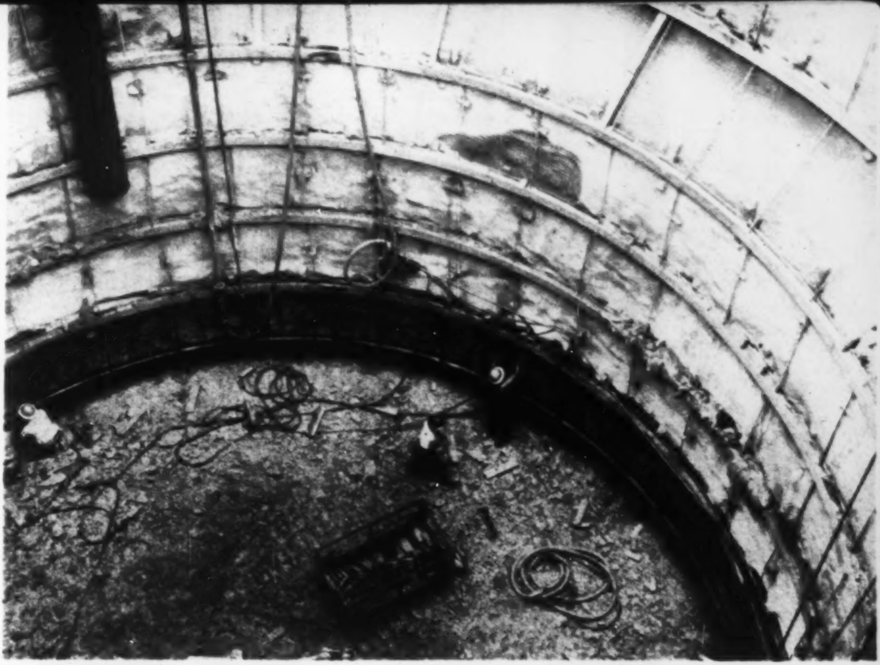
Similarly, certain equipment is hung from beams that are structurally fastened at only one end to impart a spring action. Such mounting must be extremely close in fit.

Although the missile silos are 40 ft in diameter and have a perimeter of more than 125 ft, so much equipment has to go in them that the designers are hard put to find space for hanging the gear.

• **Propellant requirements**—The exactness of missile age construction reaches its apogee in the propellant system. Here cleanliness that hitherto was possible only in the laboratory must be achieved on a mass basis. The requirements are fantastic and go beyond surgical standards in their demands.

While the same standards hold for the Atlas bases (ENR, July 2, 1959, p. 34), achieving them is substantially more difficult for the Titan missile. The Atlas fuel system is fabricated on skids in off-site plants under conditions of controlled cleanliness and then moved bodily to the launchers to be hooked up.

Off-site fabrication is not possible with the Titan. The components have to be individually installed in the field with all the risks of contamination that are inherent in field conditions. The equipment is too big to be moved into



SHAFT EXCAVATIONS are protected by steel ring beams, welded wire mesh and sprayed-on concrete before reinforced concrete is placed.

PNEUMATIC PLACEMENT of concrete is done with a truck-mounted machine.

STRATEGICALLY PLACED 150-ton dry batch plant serves four sites.

place after the propellant terminal has been constructed. It must be brought in while the work is still opened up and at its most exposed stage.

The propellant work will be done by personnel from Paul Hardeman, Inc., the mechanical specialist member of the combine. At an off-site plant, the individual components will be cleaned with trichloroethylene, nitric acid, hydrofluoric, hydrochloric and the like. They will then be sealed to prevent contamination and taken to the site.

• **The construction team**—Besides the sponsoring firm of Morrison-Knudsen Co., whose home base is Boise, Idaho, members of the combine are: Paul Hardeman, Inc., Los Angeles; Johnson, Drake & Piper, Inc., Minneapolis; Olson Construction Co., Lincoln, Neb; and F. E. Young Construction Co., San Diego.

Their $68 million worth of construction contracts is for the so-called brick and mortar portion of the project. When peak construction is reached in autumn, from 1,000 to 1,500 workmen will be on the job.

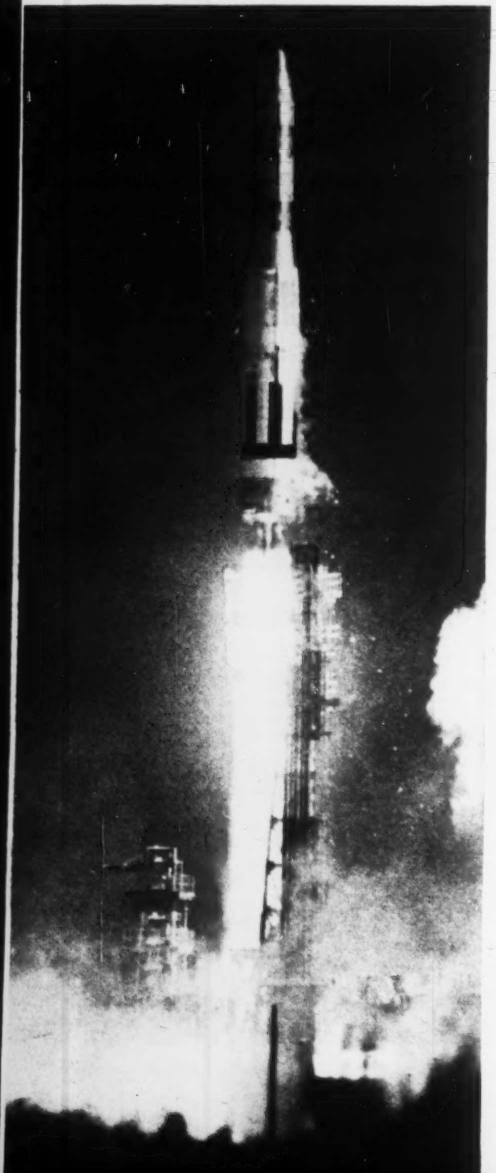
The black-box phase, which involves the electronic and other out-of-this-world gear, will be supplied by other contractors working directly with the Air Force Ballistic Missile Division.

In addition to M-K's contracts, three others are in force at the base. Colorado Construction, Inc. Denver, holds a $390,000 contract for access roads. Northwestern Engineering Co., Denver, has a $300,000 contract for access road construction in the area. Haul roads and access roads are maintained by power grader and two sprinkler trucks of 5,500 gal and 3,000 gal capacities. The access roads, now gravelled, will be two lane asphaltic concrete pavement on base course and granular sub base.

Two water supply wells for each of the six complexes are being drilled by M and G Drilling and Supply Co., Monte Vista, Colo., under a $225,000 contract. The wells are drilled to a depth of about 1,500 ft and cased with 16-in. casing. Located in the powerhouses, each pair will be operated by one 165 gpm pump and one 85 gpm pump serving as a standby. Domestic sewage and waste water will be pumped to aeration beds and into lagoons.

Daniel, Mann, Johnson, Mendenhall and Associates, Los Angeles, are architect-engineers on the project under a contract with the Ballistic Missile Division of the Air Force. The associates are Leo A. Daley Co., Rust Engineering Co. and Mason & Hanger-Silas Mason Co., Inc.

The base is being constructed under the direction of the Corps of Engineers' Omaha District.



The forerunner of the Lowry Titan base is being built at Vandenberg AFB, Calif. See story below.

At Vandenberg AFB, contractors laid . . .

The Model for Future Bases

Construction of the first underground launching facilities for the Titan intercontinental ballistic missile at Vandenberg Air Force Base, Calif., began more than a year ago—several months before the first Titan was test-fired at Cape Canaveral.

Because of this, the builders had to fashion the job to new requirements as the Titan was developed. One result was that costs rose steadily to three times the bid price. Another was that construction often had to proceed in anticipation of plans. The Vandenberg job set precedents for subsequent Titan base construction.

This first underground base is called an Operational Suitability Test Facility. Its purpose is to assemble for the first time the various fueling, control, guidance and launching facilities to be used under operational conditions. It serves as a prototype for other launching installations, determining the interrelationship of the various components. It will also be used for training purposes and could, if necessary, actually launch a missile.

The OSTF includes four underground silos—the biggest of which is 160 ft deep by 40 ft dia—and two underground buildings. All are connected by a series of tunnels. The OSTF differs from operational facilities in that the two buildings are just at ground level with no protective cover of earth. And there is only one missile silo, whereas in operational facilities there are groups of three or more. But in most other respects the first Vandenberg installation is similar to the operational base being built at Lowry AFB, near Denver.

• **Three main silos**—The central complex includes three silos. The biggest is the missile silo, 160 ft deep by 40 ft dia. It will have a steel cover and house a complex elevating mechanism. When the 110-ton Titan ICBM is ready to be fired, the cover will be moved back and the missile will be elevated rapidly to the surface.

One of the other two silos is an equipment terminal facility. This is 60 ft deep and is, in effect, a cylindrical five-story building buried in the ground.

The third main silo houses the fueling equipment. Fuel tanks are buried in the ground to one side. The fueling equipment in the silo is capable of loading the two-stage missile with liquid oxygen and rocket fuel at rates of thousands of gallons a minute. The missile is not fueled until just before firing.

A fourth silo, located apart from the other three, houses an antenna. It is 22 ft in dia for a 35-ft depth, but a shaft extends down an additional 20 ft. The antenna, part of the guidance system, is elevated above ground by a piston mechanism at the time of firing.

• **Overburden excavated**—First step in constructing the main complex of silos was to excavate about 20 ft of fairly loose overburden. This was accomplished by tractor-drawn scrapers. Except for some shale, there was no ripping involved.

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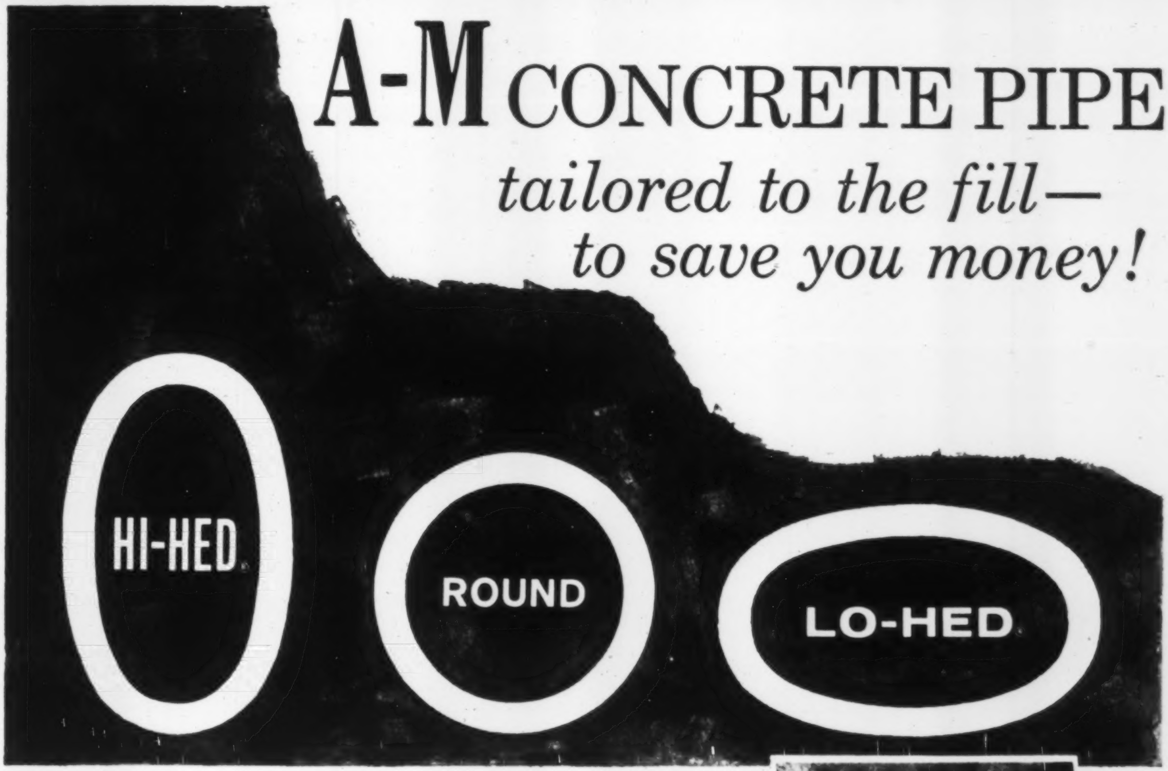

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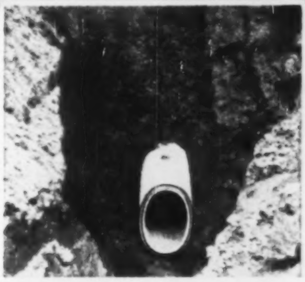

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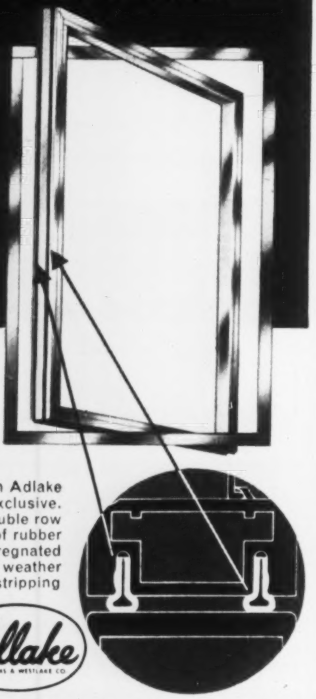

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silo excavation in firm material. And it also gave direct access to the fueling and equipment terminal silos that were later buried.

The missile silo was built to full height before backfilling.

This initial overburden excavation was about 200 ft in diameter and it provided a working area for excavating the three main silos.

The silo excavations were made larger than the finished interior dimensions to provide room for structural concrete. The missile silo hole was 44 ft dia by 165 ft deep. The other two were both 45 ft dia and 83 ft and 70 ft deep.

In actual excavation of the holes, the first and most important step on each hole was the accurate setting of a steel ring securely anchored to a series of deadmen sunk in the ground around the perimeter of the silo.

This first steel ring was important because it fixed the position of the silo. As excavation proceeded, a series of 6 in. WF compression rings was suspended from it. It also supported the slip-form equipment used to line the silo after excavation had been completed.

Excavation followed mining techniques. Most of the material was loosened by pneumatic tools. Some blasting was necessary. Material was removed by a small air-operated mucker that deposited it into a 5 cu yd skip. This was hoisted from the hole by a crane.

Silo construction was on a three-shift basis. Miners worked in two shifts on excavation and to place the 6-in. WF compression rings. These rings are approximately on 4-ft centers with each suspended from the previous one by $\frac{5}{8}$-in. bolts.

A lining crew worked on the third shift to spray a mortar coating flush with the wide flange rings. Some wire mesh reinforcing was required. The mortar merely served to maintain the hole until structural concrete was placed later.

• Slip-form lining—After the foundations were placed—408 cu yd of concrete and 34 tons of reinforcing for the main silo—one of the most interesting phases of construction, slip form lining, was begun. The first step covered a 95-ft depth involving a continuous pour on a three-shift basis that took eight days.

The slip form assembly included three platforms. Reinforcing steel was placed from the top one, concrete from the second and concrete finishers worked on the bottom platform.

The series of platforms was moved up the silo walls at the rate of 8 in. an hour by 20 pneumatic jacks manifolded to operate together.

Forms were 4-ft high and were faced with tongue-and-groove lumber braced by two rings of double 2x10 lumber.

Concrete was brought to the silos in truck mixers and deposited by a $\frac{3}{4}$-cu-yd bucket handled by a crane. The concrete had 1 in. maximum aggregate with 3,000 psi 28-day strength.

Thickness of concrete on the main silo was only 18 in. This thickness was required primarily to support vertical loads. Components of the elevating mechanism are hung at various places on the silo wall.

• Tunnels, like silos—The silos are interconnected by a series of 10-ft-dia tunnels. Tunneling operations were similar to silo excavation. Some blasting was required. Pneumatic hand tools, however, did much of the work. Material was loaded out by an air-operated mucker into a rubber-tired muck cart.

The tunnels were lined with corrugated steel liner plates in 5, 7 and 10 gage thickness.

In the tunnel between the silos and the control building is a heavy blast lock. This was constructed by open cut methods. The blast lock has thick concrete collars extending out from it to transmit thrust from the steel blast doors into the earth.

The control building is a relatively straightforward structure with a 12-in. concrete arch roof. The powerhouse has a flat roof.

About the only installation above ground level is a spray pond. This is used for cooling water for the diesel engines in the powerhouse.

The first Titan underground missile complex was bid in July, 1958. Low bidder for $2.8 million was a joint venture of Matich Bros. of Colton, Cal., and M. M. Sundt Construction Co. of Tucson, Ariz. By May 30, 1959, according to Corps of Engineers estimates, contract costs increased to $7.4 million.

The same contractors were also successful low bidders on a second Titan facility at Vandenberg in April, 1959, with a low bid of $5.9 million. This is a training facility and makes use of some of the test facility installations, such as the powerhouse.

Design of the Titan missile bases is under the direction of Col. William E. Leonhard, director of installations for the Air Force Ballistic Missile Division. Architect engineer on the work is Daniel, Mann, Johnson & Mendenhall and Associates, which includes DMJ&M, The Rust Engineering Co., Leo A. Daly Co., and Mason & Hanger-Silas Mason Co.

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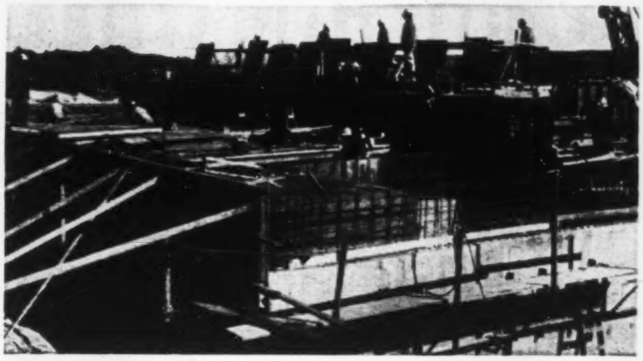
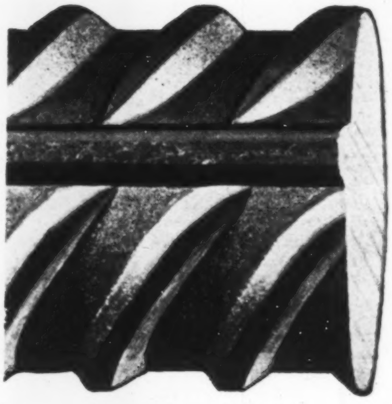


Nike installations at four sites near Kansas City are using concrete reinforced with Sheffield Crescent Reinforcing Bars.

Sheffield provides a backbone of steel for Nike missile-site structures



A No. 18 SHEFFIELD Bar.
This is an exact size section.

A Nike missile base is no small installation. For example, each of the four under construction in the Kansas City area consists of three underground reinforced concrete missile storage structure; refueling pits and barricade; missile assembly and two electric generator buildings; personnel ready building; administration, recreation and general storage buildings; two combined officers' and NCOs' quarters.

Add to all this the access roads, streets and parking areas, and you have a lot of reinforced concrete. It's reinforced with Sheffield Crescent Re-Bars, for a number of good reasons. The Sheffield "crescents" give the strongest possible bond of concrete to steel (ratio of shearing area to bearing area is 6 to 1). Sheffield re-bars distribute bond stresses so uniformly that the bars are self-anchoring. No necessity for hook anchorage, in most cases. Sizes include Nos. 18 and 14.

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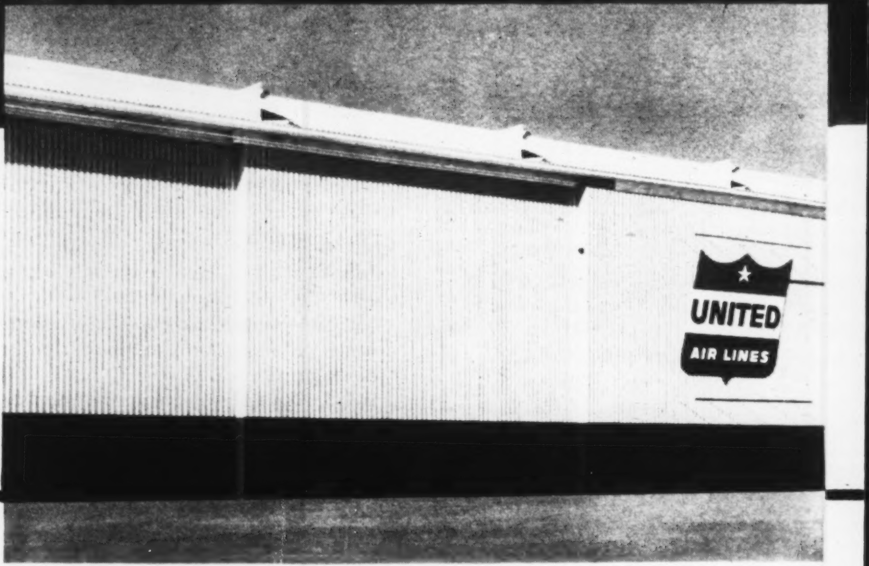

United Air Lines Service Center at San Francisco, Cal. Mahon Metal Curtain Walls were employed to lend trimness and to retain the clean lines of this unique structure which was designed to accommodate four mammoth DC-8 Jet Air Liners. Mahon Curtain Wall Plates, of the same material and pattern, were also employed as exterior facing on the large hangar doors.

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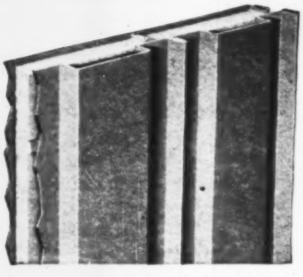

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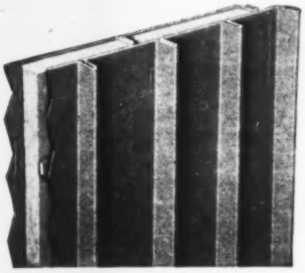
FIELD CONSTRUCTED



MAHON RIBBED WALL
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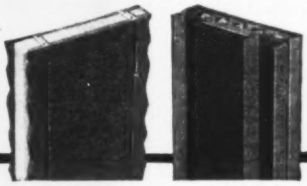

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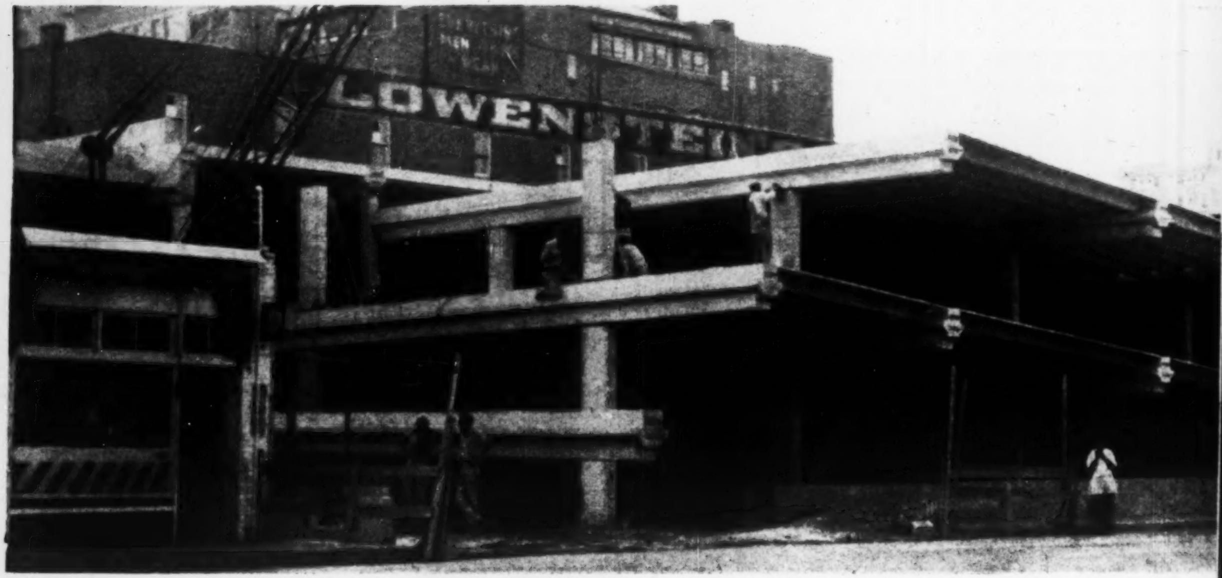


Working on this prestressed, precast garage, engineers discovered pitfalls to avoid. It's a . . .

Prestressing Job With Built-In

A two-story parking garage built for the Commerce Union Bank in Nashville has several design features of interest.

- The structure is framed almost entirely of precast, prestressed concrete members. Columns were also precast, but conventionally reinforced.
- Structural framing consists of cantilevered and suspended beam spans. They carry prestressed channel slabs covered with a 3-in. slab, which was post-tensioned to provide a watertight deck. No additional waterproofing was used on any of the framed floors.
- Part of the structure consists of continuous ramp framing that also was utilized for parking areas. The roof serves as a third floor.

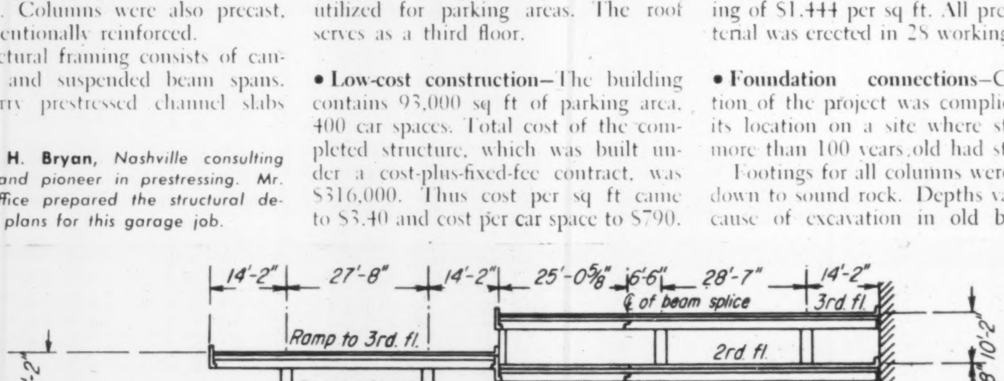
By Ross H. Bryan, *Nashville consulting engineer and pioneer in prestressing. Mr. Bryan's office prepared the structural designs and plans for this garage job.*

- **Low-cost construction**—The building contains 93,000 sq ft of parking area, 400 car spaces. Total cost of the completed structure, which was built under a cost-plus-fixed-fee contract, was $316,000. Thus cost per sq ft came to $3.40 and cost per car space to $790.

Cost of the precast framing—beams, columns, spandrel beams and floor slabs—was $78,578 or $1.27 per sq ft fob job site. Erection of the material cost $10,767 or $0.174 per sq ft, giving a total erected price for the precast framing of $1.444 per sq ft. All precast material was erected in 28 working days.

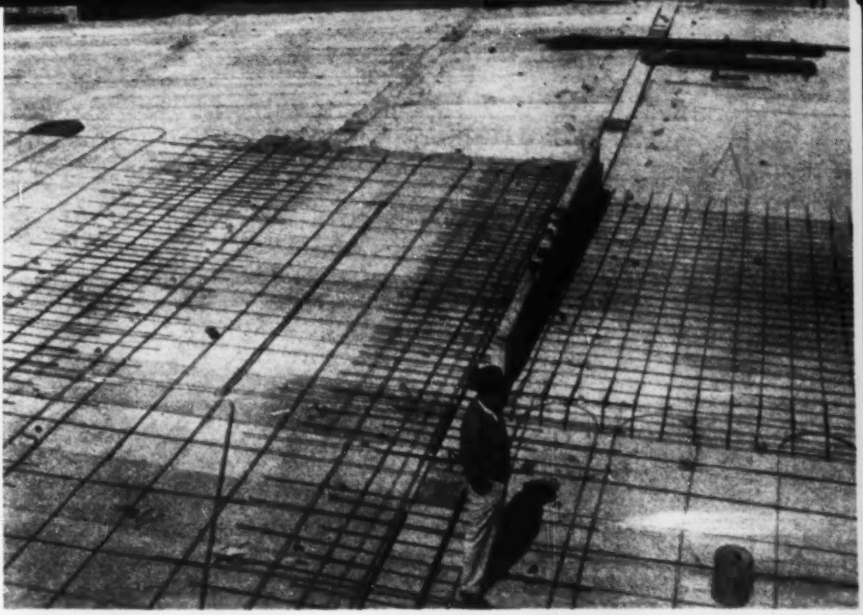
- **Foundation connections**—Construction of the project was complicated by its location on a site where structures more than 100 years old had stood.

Footings for all columns were carried down to sound rock. Depths varied because of excavation in old basement


14'-2"
27'-8"
14'-2"
25'-0⅝"
6'-6"
28'-7"
14'-2"
℄ of beam splice
3rd. fl.
Ramp to 3rd. fl.
2rd. fl.
Ramp to 2nd fl.
1st. fl.
1st. fl.
Street
Varies
10'-2"
12'-8"
10'-2"
Section A-A
14'-2"
26'-4"
14'-2"
3rd. fl.
2nd. fl.
1st. fl.
12'-8"
10'-2"
Section B-B
Existing buildings
B
A
B
A
Key Plan

SQUEEZED between existing buildings, frame saved on columns with cantilevered spans.

TURN HERE
NOEL HOTEL
CHILDREN UNDER 12 FREE
AIR CONDITIONED
CONNECTING GARAGE



PRECAST DECK receives prestressing strand before topping is placed.

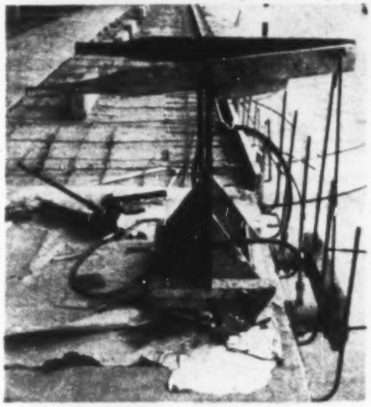
Lessons

areas. Bottoms of footings went as deep as 18 ft, but in all cases the bases of the precast columns were 5 in. below the finished floor. A concrete pedestal was cast in place between the footings and each column base.

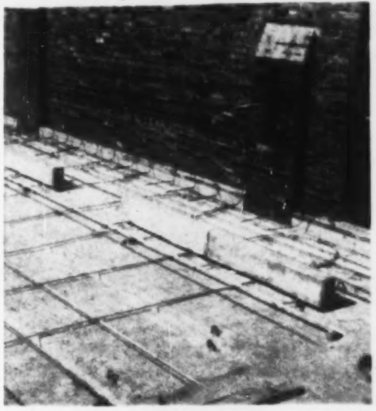
The precast columns extending between the first and second floors were, in general, 12 x 24 in. They were anchored to the pedestals with dowels extending from the pedestal into two cores 2 ft long in the bottom of the columns. After each column had been placed over the dowels, the cores were filled with grout to bond the column to the pedestal. The grout cores were ribbed to increase bond and bearing transfer.

- **Upper connections**–The connection at the top of the first-story columns and at both the top and bottom of the second-story columns was made with field-welded steel plates embedded in the concrete members. This type of connection was used in lieu of the grouted connection at the first floor to speed up erection of beams and slabs. Although the grouted connection is much cheaper, it requires more time between placing the grout and setting additional material than does making a welded connection.

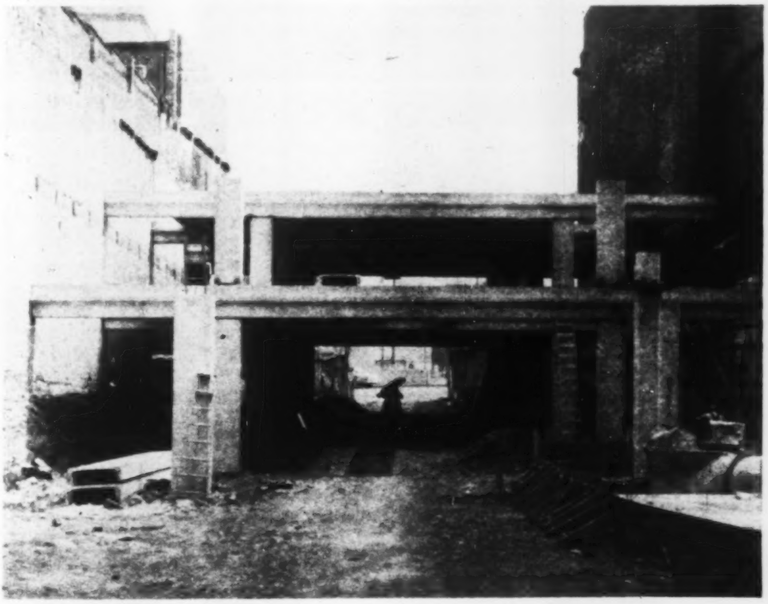
- **Prestressed floors**–Prestressed channels spanned 24 ft between the beams. The channels were 3 ft, 2 in. wide and 10 in. deep. Generally they had two $\frac{5}{16}$-in.-dia deflected strands in each leg to apply a prestress that varied along



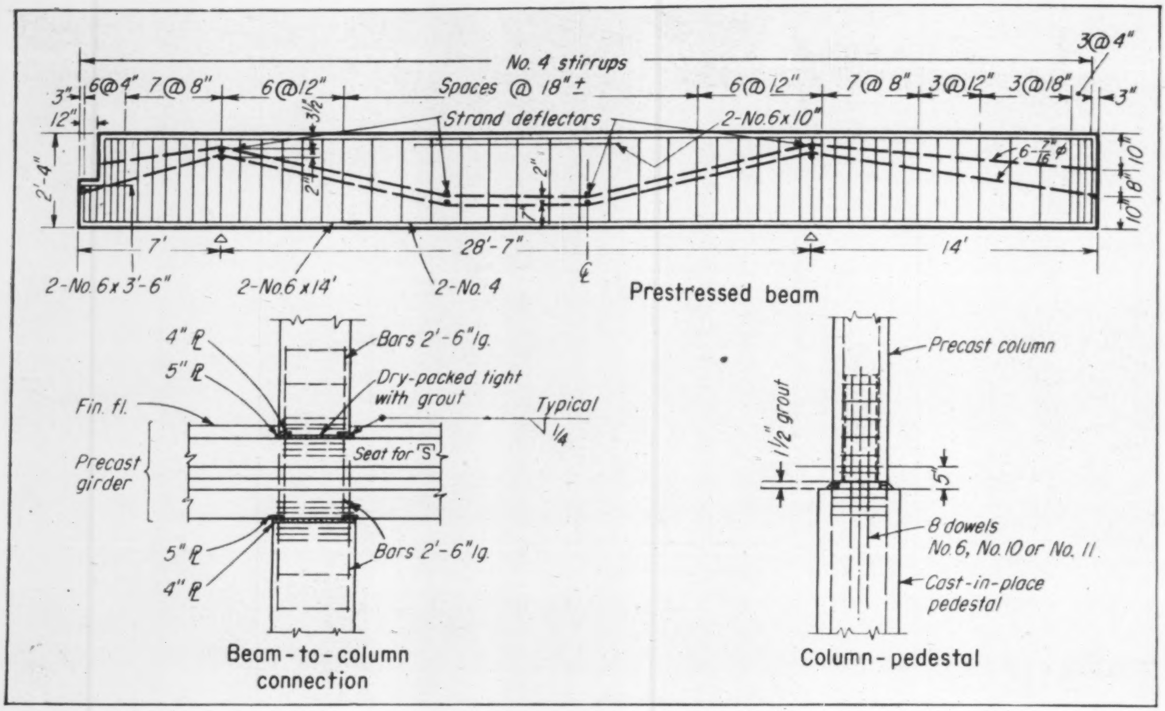
MOVABLE RING supports jacks that prestress the deck.



PRECAST BUMPERS were to be set in the top slab. They could cause cracks.



DEEP SPANDREL BEAMS give the side of the garage a finished look.



DETAILS of precast members show draping of strands in a beam with cantilevers (top), framing of beams into column (bottom left) and seating of column on pedestal.

the length of the members with a maximum uplift at midspan. The strands were anchored by bond to the concrete throughout their length.

The channels were designed for a live load of 75 psf and were made continuous under live load by the placement of mild reinforcing steel in the top slab over the beams. This reinforcement consisted of No. 4 bars 8 in. c-c.

It was decided to post-tension the top slab in a direction perpendicular to the span of the channels to make the floor as watertight as possible and hence eliminate the expense of roofing the top floor and casting an additional protective slab over the roofing. The prestressing steel in the slab consisted of ½-in. dia strands, spirally wrapped with heavy building paper. These strands were spaced 30 in. on centers and looped for anchorage at one end. They were tensioned and anchored with strand anchors at the opposite end.

The beams, though pretensioned, also were reinforced with mild steel to resist bending and handling moments. A typical beam spanned 27 ft 8 in. and cantilevered 14 ft 2 in. at either end. Where cantilevered and suspended spans were used, the beams cantilevered 14 ft 2 in. on one side and 6 ft 6 in. on the other to the point of suspension of a 25-ft span.

Reinforcing steel was used in the top of the beams to assist the prestressing strands in resisting negative moments. These bars were extended for reinforcement against tension due to prestress in the top of the beam at the center of the interior span. Some mild steel was also used in the bottom of the beam to resist handling stresses and stresses set up by the eccentricity of the strands, which are near the top of the beam at the supports.

- **Lessons learned**—The structure has been in service several months and has experienced a total temperature change of over 90F, including several short-time changes of 60F or more. During this brief period of service, and during the construction period, several significant observations were made.

- To prevent cars from backing into peripheral parapets, precast bumpers, inserted in each car space to block the wheels, were set into the top slab. Since completion of the building, several periods of intense rainfall have brought about leaks at several of the precast bumpers. Inspection of the bumpers at these locations showed a shrinkage crack between the precast bumper and the slab that did not close.

The crack probably formed after post-tensioning and hence will not close in the future. As a result of this experience, it is deemed advisable in future structures to set anchor bolts in the slab to fasten bumpers later. The cracks have been sealed with a cement-base paint, and the leaks have stopped on all but two of the bumpers.

- Specifications required that the top slab be cured by applying heavy building paper immediately after finishing. This was done, except for one pour of several bays, where a sprayed-on liquid curing agent was used. This area was on the top deck, where the sun shines directly on the concrete. Inspection on the day following the concreting revealed that shrinkage cracks had occurred in the top slab on either side of the beams.

The cracks were probably caused by extreme temperature changes—rather cool evenings and hot days, with the sun shining on the exposed slab—and rapid drying induced by high temperature. (The sprayed, exposed slab was much hotter to the hand than was the slab covered with paper.) The remainder of the slabs were cast and covered with paper and no further cracking has occurred.

In this case of cracking, it was interesting to note that when the slab was prestressed these cracks began to close, although parallel to the prestressing forces. After about a week the cracks were sealed tight and could be located only by extrusion of curing material. To date, no water has penetrated these cracks, though the structure has gone through several very prolonged rainy spells.

- The welded-plate connections between beams and columns leave something to be desired in the way of an economical connection. The steel plates cast in concrete members are more diffi-

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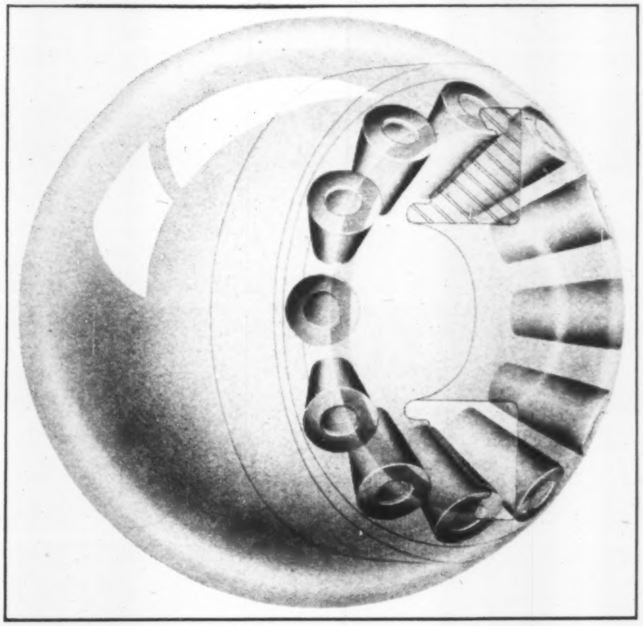

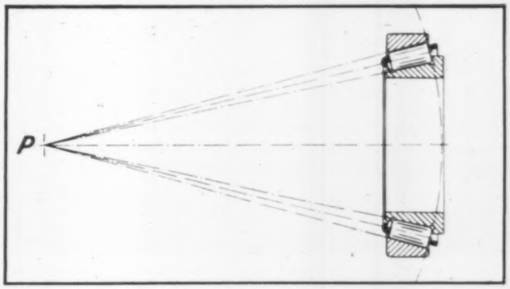

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If each roller in the bearing were to be extended in length, while retaining its taper, it would form a cone, terminating at point "P". All cones generated from all rollers would meet at point "P", which is also the center of the hypothetical sphere shown. The surface of the sphere would *touch all points on each roller's head!*

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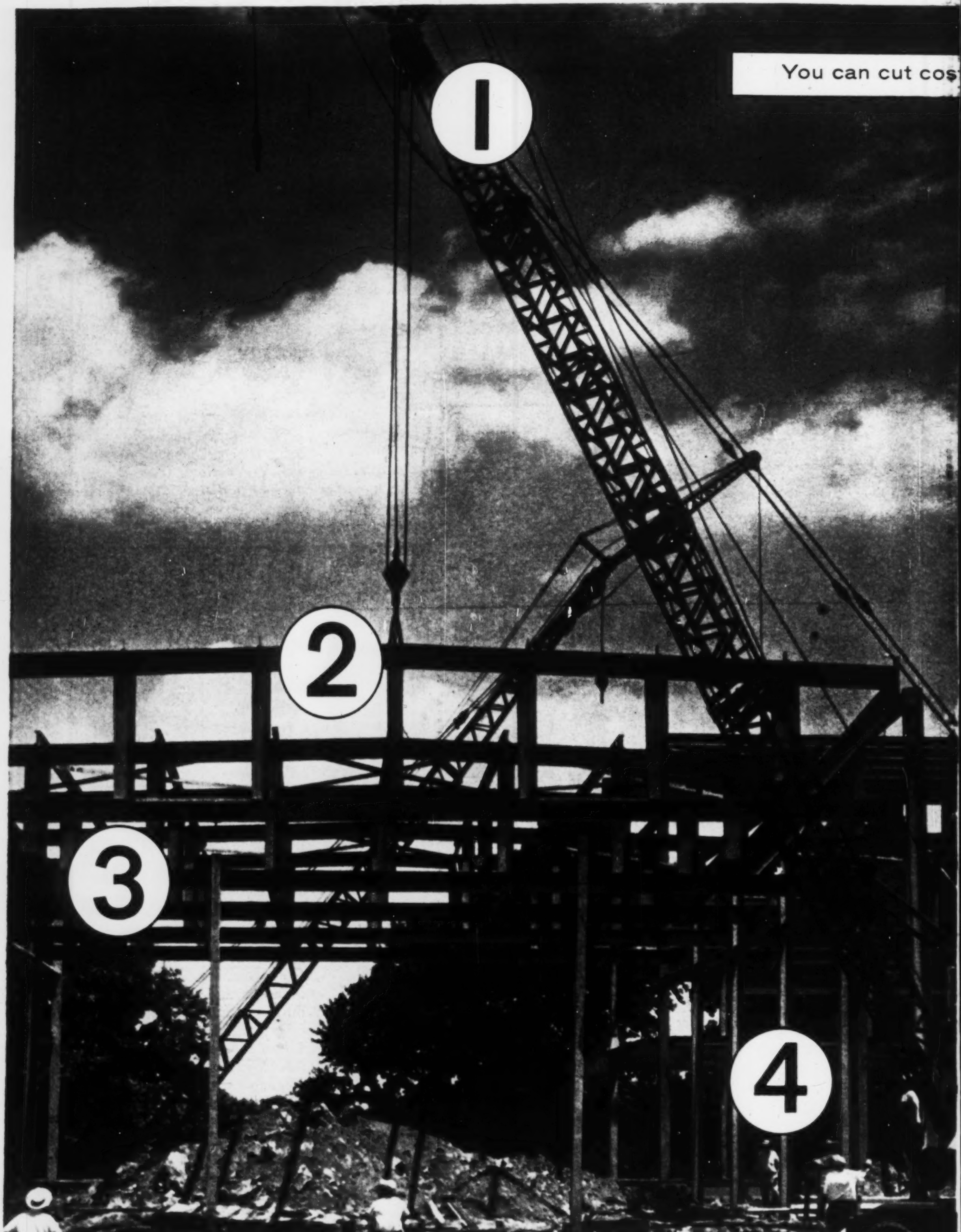
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cult to seat properly and are less prone to adjustment than would be the case with connecting steel members. Some of the bearing plates were not cast completely level.

It was necessary to shim and weld them to provide uniform bearing and transfer of loads and stresses.

A grouted connection that will transfer moment and load is highly preferable, but slows erection.

- Precast spandrel beams were used to finish off the appearance of the structure and were cast in many different shapes and slopes. Generally, they were reinforced and not prestressed. Where the channels bear on one side of the beam, a torsion connection was provided at each end of the beam and at several locations in the span.

- Some concern was felt in the beginning over movement of the joint in the beams at the suspended span. So a space was provided between the cantilevered end and the suspended beam. This space was grouted prior to post-tensioning the top slab.

To date, these joints have remained closed due to the prestress in the slab, even though the building has experienced numerous, rather large temperature changes.

- In some areas, the condition of the slab indicates that a slightly higher unit prestress should have been applied to resist temperature changes. In the wider portions of the structure a sudden temperature drop causes temporary cracks to form in the slab. These subsequently close in a matter of hours as the prestress acts to compress the concrete. To date, none of these cracks have permitted water to penetrate the slabs.

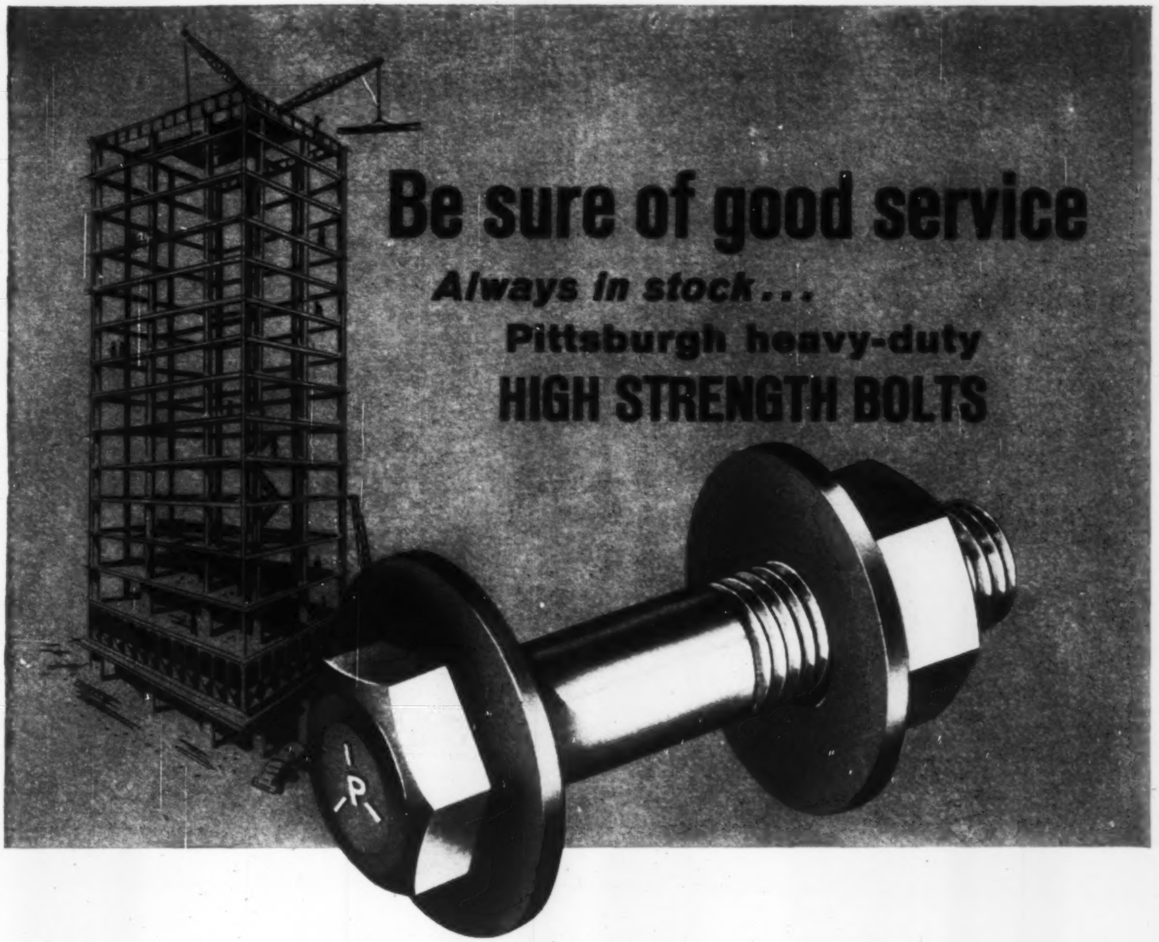
The prestress applied created about 100 psi in the top and legs of the channels; 150 psi is more desirable.

- The post-tensioning cables are the only reinforcement in the top slab perpendicular to the span of the channels. No. 3 bars were used as reinforcement normal to the cables at the center of each channel.

We believe that the prestress in the channels prevents the top slab from forming cracks in a direction perpendicular to the span of the slabs. This assumption has been proved correct to date.

The reinforcing steel in the top slab over the beams, with the one exception previously noted, has also prevented cracking in the slab at these points.

The general contractor was Nile E. Yearwood. The prestressed, precast units were furnished by the Nashville Breeko Block Co. The architect was Victor H. Stromquist. Structural designs and plans were prepared in the office of the writer, under the direction of Robert L. Whitaker.



As producers of America's most complete line of industrial fasteners, we not only have the capacity to meet your shop requirements, but the flexibility to meet pressing erection schedules in the field. A complete line of quality high strength bolts produced to ASTM Specification A-325 are always in stock, always available.

Our sales and operating personnel are trained to work closely together to give you the good service you demand. Call us, and watch the response.

Our job—to serve you with quality products. If you are not taking full advantage of our complete facilities, we want the opportunity to be of service in every way. Remember, we *really* want your business.

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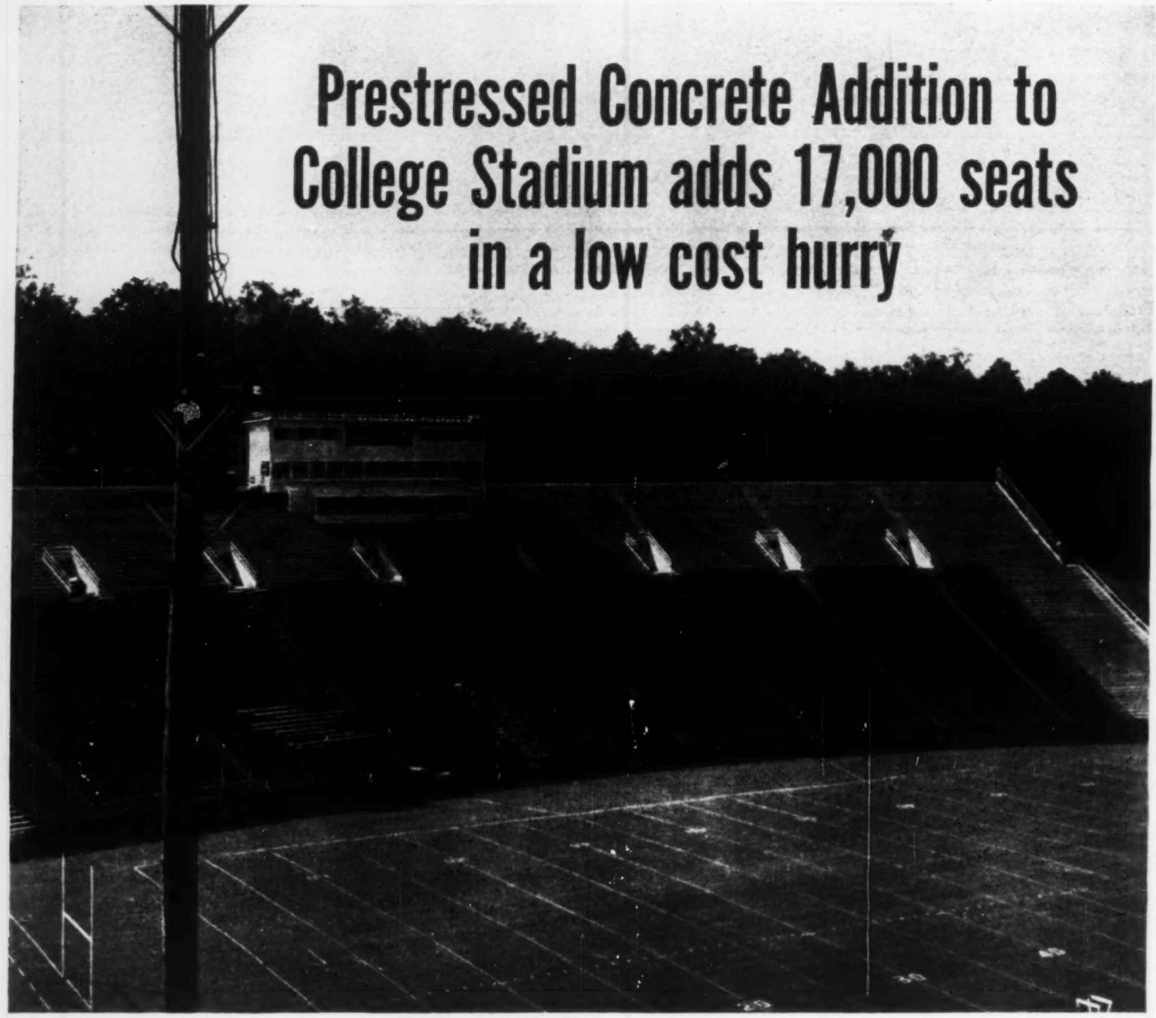
Formerly Pittsburgh Screw and Bolt Corporation • P. O. Box 1708 Pittsburgh 30, Pennsylvania

AMERICA'S MOST COMPLETE LINE OF INDUSTRIAL FASTENERS

Prestressed Concrete Addition to College Stadium adds 17,000 seats in a low cost hurry



Five simple, speedy steps, via prestressed concrete, enlarged the Clemson College Stadium, Clemson, S.C. by some 17,000-plus seating capacity.

Designed by the engineering and architectural staff members of the college with an eye to economy and construction speed, the new structure was brought in handsomely on both counts.

From finished design to completed structure, five simple steps were involved:

1. Pour reinforced concrete frames in place and allow to cure.
2. Erect precast, pretensioned channel sections (fabricated at local casting bed with Roebling prestressed strand and delivered to job site by truck).
3. Weld preplaced plates in channel sections to preplaced plates in concrete frames (see photo at right).
4. Pour concrete steps on frames between channel sections.
5. Place wooden seats on channel sections.

The result is a no-maintenance, fireproof structure brought in at a cost that compares favorably with any other method to which the same requisites—low maintenance, fireproofness, construction speed and depreciation—were applied.

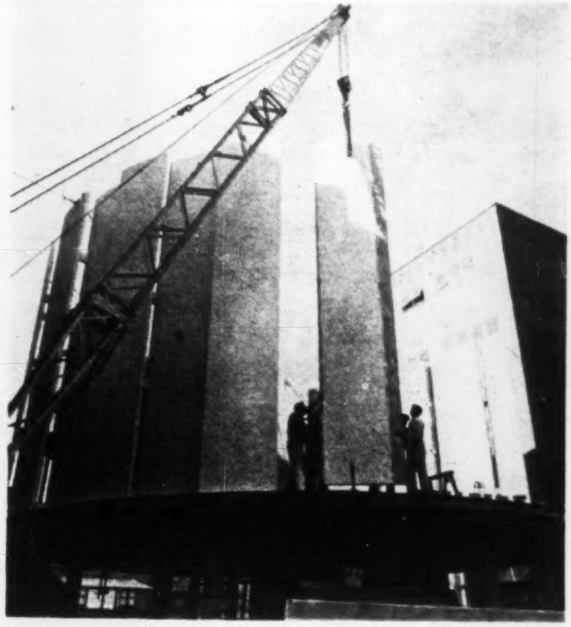
Welder joins channel sections to concrete frame. *Prestressed Fabricator:* Ballard-Rice Prestressed Concrete Co., Greenville, S.C. *Stress Relieved Strand* by John A. Roebling's Sons Corporation, Trenton 2, N. J.

The above requirements are in no way "collegiate." They can be—and are being—met by prestressed concrete in all types of structures. Transportation terminals, motels, garages, warehouses, office buildings, piers and causeways to name a few.

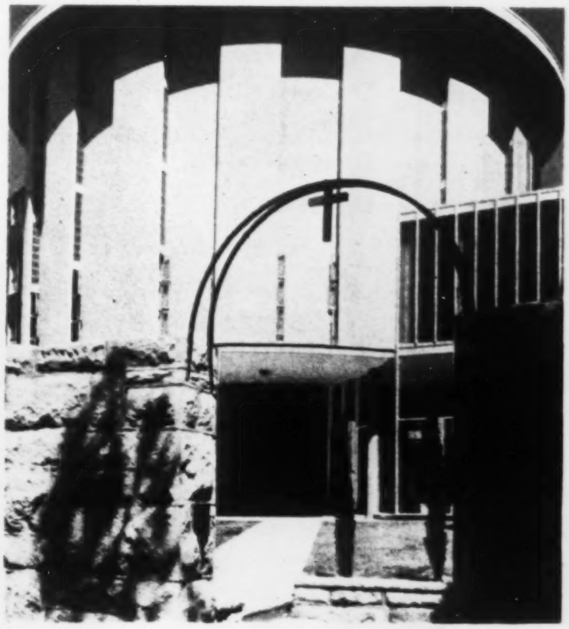
The interest with which this remarkable construction method is being met is in direct ratio to the benefits it offers the builder. Impressive. We at Roebling have fostered this method since we introduced it into this country. Consequently, we have a large body of information, data and experience covering all phases of prestressed concrete. We wish immediately to share any or all of this data with you. If your interest is general or specific, you have only to write Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, N. J. for information.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation



Workmen bolt curved concrete panels for . . .



Second floor chapel at Australian hospital.

Staggered Panels Form Sydney Chapel

Slim, curved panels of precast concrete were bolted together with staggered joints to form a 50-ft-dia circular chapel at St. Margaret's Hospital in Sydney, Australia.

Thirty-six panels, varying from 4 to 5 ft wide and standing 25 ft high, enclose the upper level of the building. Outside faces of all panels have a curvature based on a 25-ft radius; thickness varies from 4 in. at panel edge to 5 in. at the center. White quartz chips form an exposed-aggregate finish on a white cement background.

Concrete Industries (Australia) Ltd., cast the panels flat in a steel cradle and cured them standing on edge. Concrete for the work had 5,000-psi minimum strength at 28 days.

At the job site next to St. Margaret's Hospital, crews erected the panels with a truck crane with a 60-ft boom. The panels were lifted to the upper chapel level, 12 ft above ground level, hanging from a plate shackle and pin attached to the crane hoist. The bottom of each 3½-ton panel was attached to the floor slab with steel clip angles.

Instead of having splined butt joints, the panels were staggered in an overlapped pattern and held apart with five spacer blocks and bolts. Glass block was set in the vertical slits between panels. The entire erection operation was done in 40 hours.

Below the 200-seat chapel, the building foundation is a concrete raft. Overhead, the roof is a system of radiating steel beams with laminated timber struts. A copper-covered timber deck covers the frame.

The building was designed by the Government Architect of New South Wales in conjunction with structural engineers Miller, Milston & Ferris of Sydney. W. B. and F. D. Rudd of Sydney was the general contractor.

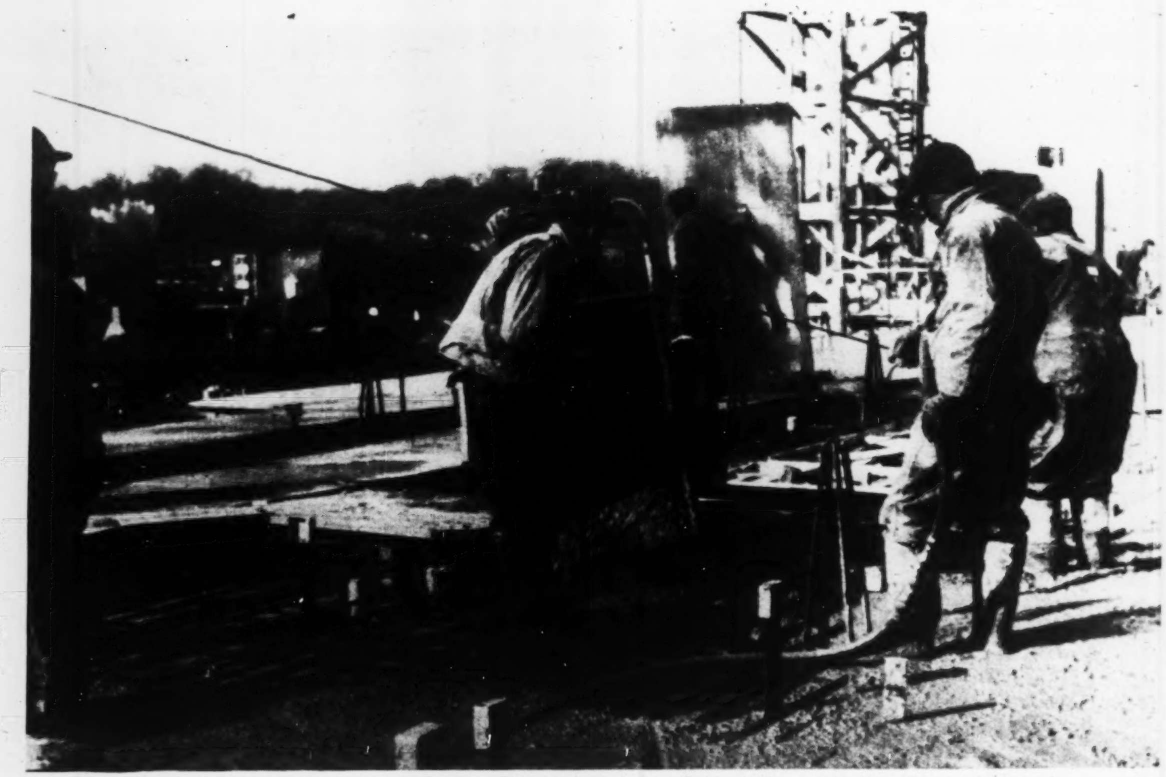
Expanding Vienna's Stadium

Vienna's 30-year-old track and soccer stadium has been expanded from its original capacity of 51,462 to 92,708.

The expansion involved addition of an entire additional ring of bleachers around the original stadium. The old and new structures are completely independent of one another.

The architect, Prof. Theodor Schoell of Vienna's Polytechnicum, designed the addition as a separate structure to allow for possible changes in level as the addition "settles down" on its new foundation.

The elevated bleachers consist of 112 reinforced concrete frames laid out on the column spacing of the original structure. Cost was $1.6 million.



Concrete treated with Columbia Calcium Chloride sets faster. Cold weather protection time is shortened.

COLUMBIA CALCIUM CHLORIDE KEEPS COLD WEATHER CONCRETE JOBS *MOVING*

Don't let cold weather cost you money on your concrete jobs this fall. Keep your pouring schedule moving—and your profits up—by adding Columbia Calcium Chloride to your mix.

It's a matter of cost-record fact. At 70°F, concrete treated with Columbia Calcium Chloride reaches both initial and final set an average of *three times faster* than untreated mixes. With lower temperatures, the accelerating effect of Columbia Calcium Chloride is even more pronounced. When temperatures drop to 40°F, concrete treated with Columbia Calcium Chloride reaches three and seven day strengths in about half the normal time!

The result is that in spite of lower temperatures, you meet strength specs days ahead, pull forms faster, get finishers on and off the job without profit-cutting overtime.

These specific advantages add up to the fact that *now* is the perfect time to analyze your batching procedures, or talk with your ready mix supplier. Make sure Columbia Calcium Chloride is a part of your next pour.

For more information on profit-making Columbia Calcium Chloride, just write to Calcium Chloride Department at our Pittsburgh address or to any of our fourteen conveniently located District Sales Offices.

Columbia Calcium Chloride can be added at the plant or on the job site.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

A Subsidiary of Pittsburgh Plate Glass Company • One Gateway Center, Pittsburgh 22, Pennsylvania

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland • Boston • New York • St. Louis • Minneapolis • New Orleans • Dallas • Houston Pittsburgh • Philadelphia • San Francisco IN CANADA: Standard Chemical Limited

Long Hotels for Short Stays

Passengers delayed at airports soon will be able to wait it out comfortably in private rooms.

New railroad-car-like hotel units will provide the accommodations. The first of the specially designed steel curtain wall units will be erected at Washington National Airport early next year.

In appearance and function, "Airwayte" is similar to Pullman accommodations. The main body of a unit consists of 18 compartments, which stand 9 ft above the ground and are reached through a center base housing a lobby and stairwell, electrical outlets and plumbing.

The base of a unit occupies an area 16 x 19 ft—about the space of two parked automobiles—so that an Airwayte unit can be easily erected in a parking lot or other area wherever space is at a premium.

The exterior walls will be porcelain enamel on steel, and can be supplied in a wide range of colors to blend with other airport buildings. The steel fabricated panels will be 2⅝ in. thick and will contain glass fiber insulation. Interior panels will be vinyl coated.

Each compartment measures 7½ x 6 ft on the inside.

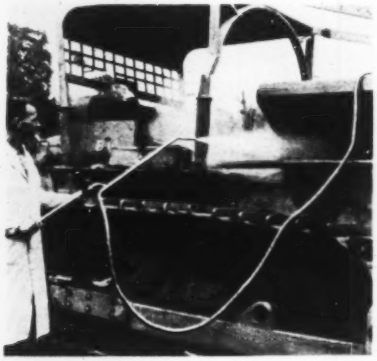
Each compartment is soundproof and contains a bed, desk, toilet, shower, individual air-conditioning control, radio, telephone and a call system for notifying occupants of their flight departure time. A porter will be on duty in each unit.

Rent will be $3.00 for the first four hours and 50 cents for each hour thereafter.

At Washington National Airport, the first Airwayte units will be adjacent to the main administration building. Hotel Corp. of America is owner-operator.

At other airports Airwayte will let construction contracts on a franchise basis to builders. Completed units will then be leased to the hotel corporation to furnish and operate. AIRWAYTE INTERNATIONAL, INC., SAN FRANCISCO, CALIF.

Engine Exhaust Powers Cleaning Gun



A high-pressure gun operates off the exhaust of a diesel or gasoline engine to clean equipment.

The X-O Kleen Gun consists of a 14-ft length of flexible stainless steel tubing fitted with a cap that adapts to any size exhaust stack. A rubber suction hose dropped into any 5-gal water can draws up the cleaning solution, which may be any steam-cleaning compound, diesel oil or water.

Pressure is varied by opening or closing engine throttle says the manufacturer. Gun sells for about $100. SEABOARD SALES OF WASHINGTON, INC., BELLINGHAM, WASH.

New Products Briefs . . .

• **Diesel roller**—A diesel-powered model, SP-54B-D, of the 10-ton-capacity, rubber-tired, self-propelled roller is available. The four-cylinder diesel engine develops 65 hp at 2,000 rpm. Equipped with a torque converter, the roller travels at up to 20 mph. BROS, INC., MINNEAPOLIS, MINN.

• **Masonry drills**—For diamond drilling through reinforced concrete and other hard materials, five Drillmaster rigs are available. DIAMOND PRODUCTS, INC., 333 PROSPECT ST., ELYRIA, OHIO.

• **Plastic insulation**—A plastic foam insulation, "Honeyfoam," made from expanded polystyrene plastic has a low thermal conductivity (K-factor 0.25 at 40 deg F), is light weight and makes an excellent vapor barrier, according to the manufacturer.

It is also used as a plaster base for interior and exterior walls and ceilings. It is available in a wide range of sizes and offers big savings in time and labor to the contractor. SERVICISED PRODUCTS CORP., 6051 W. 65TH STREET, CHICAGO 38, ILL.

2 ways you save money with a dependable

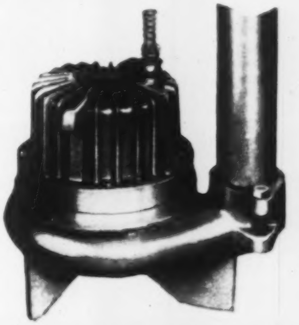
WEINMAN

immersible non-clog pump

The Weinman Type M pump easily handles liquids with large suspended solids while completely immersed. Yet, this compact, efficient pump saves you money two ways. You save on original cost . . . and you save again on installation cost. No pit cover or other special installation equipment is needed. Just lower the pump into the pit, connect the discharge line and waterproof lead cable. That's all. The pump is ready to handle sewage, drainage water and industrial waste.

Here's a bonus saving. Maintenance or the few repairs ever necesary can be made quickly and simply. All you do is disconnect the discharge pipe and lift the pump out of the pit.

It will pay you to get full information about the Weinman Type M pump. Write us for free bulletin No.1700. Or, call your Weinman Pump Specialist. He's listed in the Yellow Pages.

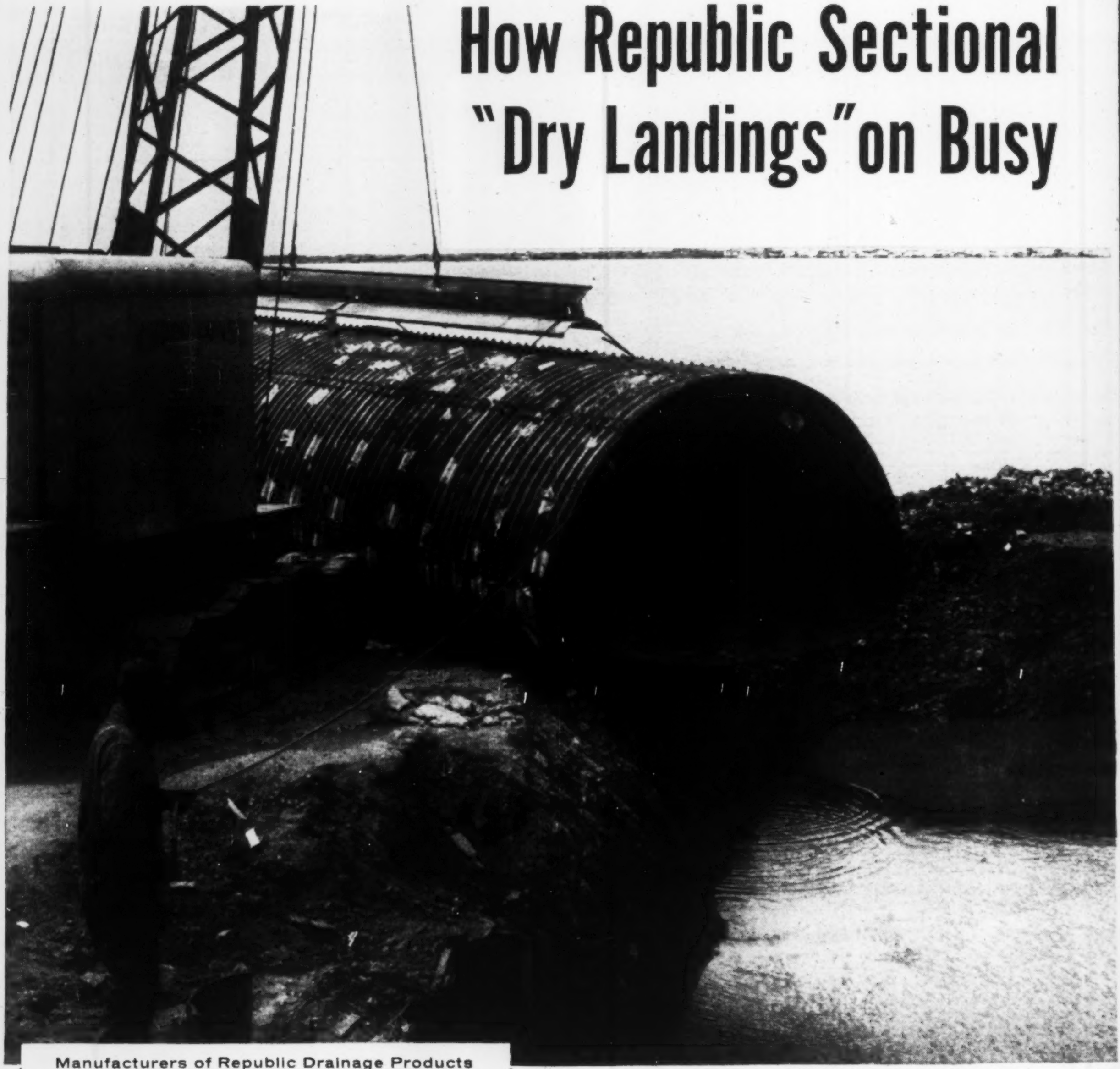


THE WEINMAN PUMP MFG CO

290 SPRUCE STREET • COLUMBUS 8, OHIO

Centrifugal Specialists

How Republic Sectional "Dry Landings" on Busy



Curro Construction Company, Cleveland, Ohio, General Contractor.

QUICKLY-ASSEMBLED elsewhere with special fasteners, this 44-foot asphalt-coated section is "ready for the plunge."

EASILY LIFTED by crane, 20-ton section of Republic Pipe-Arch is hoisted over brink into waiting drainage ditch.

LOWERED INTO PLACE this section is ready to be fastened to its neighbor. Joining under water creates no serious problem.

Manufacturers of Republic Drainage Products

Bark River Culvert & Equipment Co.
Escanaba, Mich.

Beall Pipe & Tank Corporation
Portland, Ore. • Boise, Idaho

Bluegrass Pipe & Culvert Co.
Louisville, Kentucky

The Boardman Co.
Oklahoma City, Okla. • Tulsa, Okla.

Carolina Culvert & Metal Div.
Florida Steel Corp.
Statesville, N. C.

Central Culvert Corporation
Alexandria, La.

Choctaw, Inc.
Memphis, Tenn. • Birmingham, Ala.

Dominion Culvert & Metal Corp.
Roanoke, Va.

Eaton Metal Products Corp.
Omaha, Neb. • Hutchinson, Kan.

Eaton Metal Products Company
Billings, Mont.

Empire State Culvert Corp.
Groton, N. Y.

Garland Steel Co.
Phoenix, Ariz.

Illinois Corrugated Culvert Co.
Bushnell, Ill.

Jansen Bridge & Supply Company
Sandusky, Mich.

H. V. Johnston Culvert Co.
Minneapolis, Minn. • Aberdeen, S.D.

Logansport Metal Culvert Co.
Logansport, Ind.

M & M Hiway Materials Co.
Columbia, Mo.

North Dakota Metal Culvert Co.
Fargo, N. D.

Northeastern Culvert Corp.
Westminster Station, Vermont

Pacific Corrugated Culvert Co.
Sacramento, Calif.
Temple City, Calif.

The Pedlar People, Ltd.
Oshawa, Ont.

Republic Steel Corporation
Culvert Division
Canton, Ohio • Harrisburg, Pa.
Charlotte, N. C. • Hammond, Ind.

Spokane Culvert & Fabricating Co.
Spokane, Wash.

Thompson Pipe & Steel Company
Denver, Colo.

Tri-State Culvert & Mfg. Div.
Florida Steel Corp.
Tampa, Fla. • Decatur, Ga.

Utah Culvert Company
Ogden, Utah

Wisconsin Culvert Company
Madison, Wis.

Wyatt Metal & Boiler Works
Dallas, Tex. • Houston, Tex.

Plate Pipe-Arch Aids Lakefront Airport

CLEVELAND, OHIO, ENGINEERS briefly furrowed their brows when they discovered an urgent need for additional drainage facilities in a sizable downtown area near the hub of the city. The obvious solution was to drain the area into the nearby waters of Lake Erie.

A COMPLICATION AROSE, however, in Cleveland's busy Lakefront Airport, sandwiched squarely between the lake and the area to be drained. Any feasible plan would have to be both economical and effective—and must also provide safety for the airfield, its hangars and other facilities, and its landing strips.

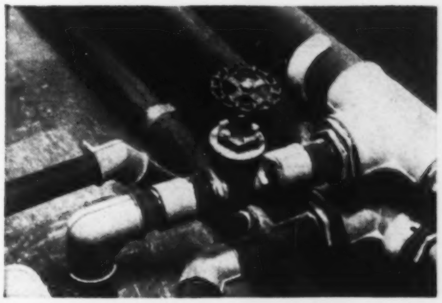
INTERVENING SOIL, between the drainage area and the lake, was found to be loose and unstable, necessitating an enclosure. But large-diameter, full-round pipe would require too much headroom. And a multiple installation of small pipe would be too costly.

THE SOLUTION WAS DISCOVERED in Republic Sectional Plate Pipe-Arch. In addition to its relative economy, the broad, flat base of Republic Pipe-Arch would permit the transmission of a greater volume of water at low heads than *round* pipe of equivalent size.

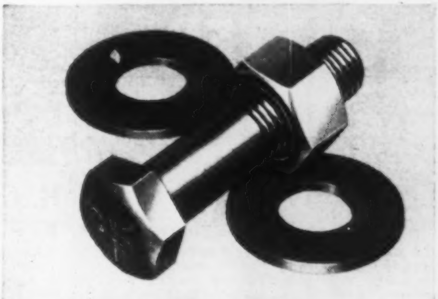
A CORRUGATED METAL DRAINAGE STRUCTURE 1850 feet long, with a rise of 7 feet, 11 inches, and a span of 12 feet, 6 inches was installed. It consisted of 5-gage corrugated Sectional Plate, asphalt-coated for long-lasting resistance to corrosion, and freedom from cracking, crumbling, or spalling.

SEVERAL LATERAL TIE-INS, running east and west across the airport, provided extra assurance of "dry landings" at all times. Moreover, it was found that the structure could handle drainage from as far south as Cleveland's Euclid Avenue—an artery bordering the principal downtown area of the city.

CLEVELAND'S EXPERIENCE is representative of the effective way Republic Sectional Plate Pipe-Arch can help solve many perplexing drainage problems. You'll find it well worth while to investigate these possibilities thoroughly. For further details, contact the Republic Drainage Products Manufacturer nearest you (see listing, lower left), or mail coupon.



LIGHTWEIGHT REPUBLIC SRK PLASTIC PIPE resists highly corrosive chemicals, prevents scale build-up, yet costs no more than ordinary pipe. SRK is easy to handle and install . . . even in tight or limited space. Send coupon for information.



REPUBLIC HIGH STRENGTH BOLTS provide a vise-like clamping force that transfers loads to the structural members themselves. Fatigue life is improved to the point where it need no longer be a design consideration. For details, mail coupon.

REPUBLIC ELECTRUNITE® GROOVED-END TUBING offers cost-saving, time-saving advantages in many mining applications. Ideal for air, water, drainage lines, for tunneling and other heavy duty operations. Send coupon for details.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

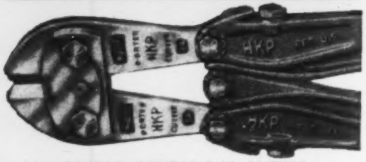
REPUBLIC STEEL CORPORATION
DEPT. EN-8241
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:

☐ Sectional Plate Pipe and Pipe-Arch
☐ High Strength Bolts
☐ SRK Plastic Pipe
☐ Grooved-End Tubing

Name ______ Title ______
Company ______
Address ______
City ______ Zone ______ State ______

THERE'S A

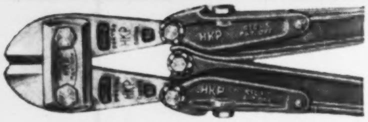


The PORTER CENTER-CUT CUTTER — In 6 sizes, for cutting up to ¾". Our most popular tool. Ideal for general free cutting of soft and medium hard steel. Other models for HARDER METALS.

HKP
PORTER
CUTTER

The PORTER WORK-STATION CUTTER — in 3 sizes, up to ½" capacity. For continuous cutting operations it can increase the metal-cutting capacities of one man up to 300%! Saves time, work, money! Leaves one hand free to feed or hold material.

FOR EVERY



The PORTER HEAVY DUTY CUTTER — in 3 sizes, up to ¾" capacity. Specially designed for those rugged jobs in steel mills, construction companies and other heavy industries!

METAL
CUTTING
JOB

SAVE TIME AND MONEY!
Over 100 Cutters in Various Sizes and Types — Hand or Power Operated

Contact your Industrial Distributor or write direct for your FREE CATALOG!

CUT— up to ¾" rods with HAND OPERATED TOOLS up to 1⅜" rods and 2½" power cable with POWER OPERATED TOOLS.

H. K. PORTER, inc.
Somerville 43, Mass.

Men and Jobs

R. G. LeTourneau Honored For Defense Contributions

Robert G. LeTourneau, president of R. G. LeTourneau, Inc., Longview, Tex., and pioneer in the field of earthmoving equipment, wins the National Defense Transportation Association's Award for contributing most to the effectiveness of the transportation industry in support of national security.

Mr. LeTourneau first attracted national attention in the 1920's when his small earthmoving machines greatly affected construction methods throughout the world. In World War II, his company supplied the armed forces with an estimated 70% of all basic earthmoving equipment.

In 1953 Mr. LeTourneau turned his attention to developing equipment for hauling off-road freight, for handling heavy logs and other heavy materials.

Careers

Business

Clifford J. Williams has been appointed to the staff of the Oak Ridge Y-12 plant, an atomic energy installation of Union Carbide Nuclear Co.

Ray Colcord, Jr., formerly chief consultant in the facilities planning department of Ebasco Services, Inc., has joined Erwin S. Wolfson, New York City investment builder. He will serve as vice president of Grand Central Building, Inc., a $100 million skyscraper which Mr. Wolfson and his associates are erecting.

George W. Lathrop & Sons, Inc., Toledo, general contractors, has changed its name to the **Lathrop Co.** and has taken over the liquidated Lathrop Construction Co., Lansing, Mich.

Associations

James T. Cook, of Timken Roller Bearing Co., has been elected president of the Canton Ohio Regional Society of the Ohio Society of Professional Engineers.

David Benham has been appointed for a five-year term to the Board of Engineering Registrations of the State of Oklahoma. The youngest man ever appointed to the board, he is senior partner of Benham Engineering Co., Oklahoma City and Muskogee, Okla.

Clarence H. Ax is the newly elected president of the Engineers' Club of St. Louis. President of the Clarence H. Ax Construction Co., he is past president of the St. Louis Section of the American Society of Civil Engineers.

C. W. Brinck, sanitary engineer for the state of Montana, is the new Montana Society of Engineers president.

Arnold Arch has been named executive secretary of the Air Pollution Control Association. He will also serve as senior fellow of Mellon Institute, heading the Institute's APCA-sponsored Multiple Air Purification Fellowship.

Stanley M. Hawkins has been appointed national director of the engineering service of the Boy Scouts of America. He is responsible for camping sites and office buildings.

G. A. Robinson has been elected president of the National Clay Pipe Manufacturers, Inc. He has served for the past six years as the association's vice president in charge of Washington activities and government relations.

Public Works

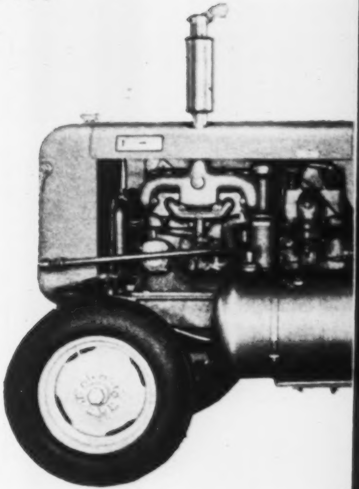
J. R. Harbison has been appointed director of the planning division of the Kentucky State Highway Department. For the past ten months he has been on special assignment on the staff of Dwight H. Bray, chief highway engineer, serving as liaison man with the Frankfort, Kentucky office of the Bureau of Public Roads.

Wiley Goodrich joins the North Carolina Highway Department at Raleigh, N. C. as bridge maintenance superintendent. For the past 13 years he has been construction superintendent of the Bowers Construction Co., Raleigh, N. C.

Donald T. Overman has been named district engineer at Nashville, for the North Carolina Highway Department. He had been a staff engineer for the highway office since 1956.

Henry M. Burgin, former assistant division engineer, has been appointed division engineer at Charlotte, N. C.

from any angle...



It's a new, better Tractair!

Le Roi's self-propelled air-compressor has been redesigned to give you easier operation, easier serviceability

Le Roi's famous Tractair — the most popular self-propelled air compressor in the world — is now available in a new design! It's packed with convenience, features and maintenance-reducing innovations that will make Tractair an operator's dream — and a contractor's favorite.

The 42-hp tractor delivers 125-cfm air power to widely scattered spots all over the job-site — over terrain where an ordinary compressor can't even be towed by truck! And when it gets there, you can park it on a hillside, in a ditch . . . anywhere you want up close to the job, where short hose lines assure full power at the tool.

There's no dead time while this compressor waits to be towed — it moves itself!

And look at the new features: an upholstered seat with back rest — no more backache-creating bucket; power steering* to increase easy maneuverability; a completely removable hood to speed servicing and cut down on finger-cramping maintenance; completely enclosed battery where it won't check or weather; conveniently grouped, read-at-a-glance control panel; easily-reached, lockable tool box big enough to hold a couple of sinkers or breakers; 12-volt ignition system for fast starts in any weather — all in a modern design that matches serviceability with good looks!

See this newly improved unit at your Le Roi distributor — it can be your hardest-working, best utilized machine. Or write for more information to Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wisconsin.

*Optional

LE ROI TRACTAIR AIR COMPRESSORS

PORTABLE AND TRACTAIR® AIR COMPRESSORS
STATIONARY AIR COMPRESSORS
AIR TOOLS

T-901

NEW-

Tow it into place

. . . Weir Contracting Co. tows their Heltzel Unitized, Mobilized Batching plant from previous job site on its own transportation wheels . . .

Set it up fast

. . . batcher section is raised into position, hinged columns are lowered and bolted in place . . .

Heltzel's new 100 and 150-ton, pushbutton batching plants are now *unitized* and *mobilized* for easier moving—for faster setup—for greater savings of time and money.

The new plant consists of two self-contained mobile sections; hopper section and batcher section (including scales) with new fold-up supporting columns. Both sections have built-in wheel assemblies and towing tongues—ready to roll.

Weir Contracting Company of Detroit, Michigan reports: ". . . Our first job was in Greenbrier Meadows Subdivision, Livonia, Michigan. After the plant arrived on the site it was ready for operation in a very few hours. We found that the speed of batching will give two complete batches in thirteen seconds. On subsequent work, the plant was dismantled and ready for transportation in two hours and towed by small, single axle dump trucks to the new location. We have found that the built-in transportation wheels save us over $100.00 a move because of not having to rent trailers."

For complete data and specifications contact your nearby Heltzel representative—or write us direct.

. . . bin section is positioned and bolted on top of batcher section.

Start batching

← In just a few hours this full size, high capacity, pushbutton paving plant is ready to operate!

**THE HELTZEL STEEL FORM
AND IRON COMPANY
WARREN, OHIO**

Steel Reservoirs for California Air Base

Seventeen contractors competed for the water lines, pumphouses and booster plant, to provide additional water supply facilities at the Edwards Air Force Base, Edwards, Calif. The Corps of Engineers, Los Angeles, awarded contracts totaling $491,819 for:

	Amount	% of Total	Change from EE
Water lines, pumphouses & booster pumping plant	$414,071*	84.2	−0−%
Steel reservoirs	77,748**	15.8	−3.5%
Total awards	$491,819	100.0	−0.6%

* Camco Constr. Co., Inc., Fullerton, Calif.
** Larsen & Co., Salt Lake City, Utah.

Camco, on a bid that included no charge for site and road excavation and grading, came in just $19 over the engineer's estimate. Work includes the water lines, two pumphouses and equipment, a booster pumping plant, and related work.

The steel reservoir contract calls for a 100,000 gal reservoir to be installed at the booster pumping plant and a million gal reservoir to be connected to the existing steel reservoir.

Minimum wages include: carpenter $3.60; crane & power shovel operator $4.01; common laborer $2.88.

Water Lines, Pumphouses & Booster Plant

1C	Camco Constr. Co., Inc., Fullerton, Calif	$414,071
2	Bovee & Grail Constr. Co., Paramount, Calif.	439,444
17	Southern Engr. & Constr. Co., Inc., Long Beach, Calif.	648,528
EE	Corps of Engineers, Los Angeles	414,052

Bids: 6-11-59 Items	Unit	Quantity	Unit Prices 1 C	2
Exc, site & road, & grading	ls	job	$ -	$6,000
Water line, 16"	lf	29,400	7.90	8.16
10" asb cmt	lf	1,240	4.90	6.06
8" CI	lf	10	20.00	18.80
Gate vlv, 16", geared with by-pass flanges in conc vault, class 250	ea	2	2,000	1,794
125	ea	4	1,600	1,416
Blowoff vlv & conn in 16" vlv conc vault, 6"	ea	7	250.00	399.00
& conc vault	ea	4	850.00	852.00
Air & vac vlv in conc vault	ea	4	425.00	118.00
CMP jacked under RR	lf	250	34.00	47.00
Tap sleeve, 14" & 12" gate vlv to existing 14" supply line	ls	job	1,600	2,503
Dir burial cable, compl in pipe trench	lf	30,600	0.55	0.51
Pumphouse & equip, Well NB #3, 750 gpm	ls	job	10,300	11,251
#4, 1,000 gpm	ls	job	9,300	10,111
Booster pump plant, incl yard piping, 1,000 gpm present, 2,000 gpm future	ls	job	64,500	79,864
Electric distribution system	ls	job	26,600	19,000
Water line, special 16" conc stl cyl	lf	1,000	9.00	9.10
Dust control	ac	37	315.00	290.00

Commence: 7-2-59. Complete: 330 days

Steel Reservoirs

1C	Larsen & Co., Salt Lake City, Utah	$77,748
2	*Manco Constr. Co., Long Beach	83,532
3	Chicago Bridge & Iron Co., So. Pasadena	83,665
16	N. P. Van Valkenburgh Co., Inc., El Monte	102,115
EE	Corps of Engineers, Los Angeles	80,530

Bids: 6-11-59 Items	Unit	Quantity	Unit Prices 1C	3
100M gal stl reservoir at booster pumping plant	ls	job	19,915	$18,580
1 mil gal stl reservoir & conn to exist stl reserv	ls	job	57,833	65,085

*Contractor stipulated acceptance of water line contract, combination of both contracts, but not reservoirs alone

Commenced: June 25, 1959

Boston Syphon Draws Wide Bid Spread

The two high of the eleven bidders that competed for this Boston sewer relocation job, topped the low bidder by 178% and 120% respectively. The high bid was more than double the engineers' estimate. The Boston Public Works Department award at $215,335, to low bidder, Pacella Bros. Corp., Dedham, Mass., was 10% under the engineers' estimate. Robert P. Shea is public works commissioner and E. G. A. Powers is sewer division engineer. Camp, Dresser & McKee, Boston, is the consultant.

The twin 30-in. reinforced concrete pipe inverted siphon, to carry an existing sewer over the construction site of the Prudential Insurance Co., will be 880 ft long, including appurtenant structures. Eighty feet will be jacked under the main line of the Boston & Albany RR, 18 ft below ground water table.

All work under the contract must be performed without lowering the wate level in adjacent areas.

Compressive strength of Class 30 concrete is 3,000 psi, at 28 days.

Minimum wages include: maintenance engineer $3.50; crane, power shovel & trenching machine operators $3.875; common laborer $2.65.

1C	Pacella Bros. Corp., Dedham, Mass	$215,335
2	John J. Botti Co., Inc., Dorchester Mass.	240,435
11	DiMinico & Palotta, Inc., Boston, Mass	598,845
EE	Boston Public Works Dept., Div. of Sewers and Camp, Dresser & McKee, Boston	238,559

Bids: 6-22-59 Items	Unit	Quantity	Unit Prices 1 C	2
Excavation, earth	cy	8,200	$10.00	$17.00
below grade	cy	300	15.00	6.00
outside trench	cy	200	3.00	7.00
Lumber, remov old	Mfbm	5	50.00	50.00
Excavation, rock	cy	75	20.00	20.00
Reinf conc pipe, 42"	lf	10	30.00	16.00
30"	lf	1,765	14.00	13.00
18"	lf	75	9.00	8.00
12"	lf	14	8.00	5.00
Metal pipe, 42"	lf	285	32.00	27.00
Gravel, bank	cy	2,250	4.00	4.00
screened	cy	35	8.00	5.00
Lumber left in place	Mfbm	5	210.00	300.00
Concrete, class 30	cy	745	40.00	30.00
Property restoration	ls	job	1,700	5,700
Jacking under RR	ls	job	35,000	12,000
Manhole, standard	vf	7	34.00	70.00
special	ls	job	800.00	1,300
Inlet, special	ls	job	7,000	6,600
Existing outlet, revise	ls	job	1,200	1,500
Miscellaneous	ls	job	5,500	4,000

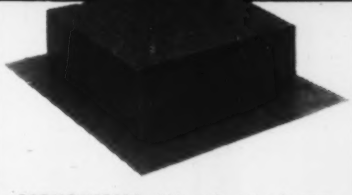
Commence: 7-7-59. Completion schedule: 250 cal days.

JAY-PANS

America's Finest Forming Medium for

CONCRETE CONSTRUCTION

Saves money! Saves labor! Saves time!



ECONOMICAL! Although priced competitively with conventional forms, Jay-Pans give you more for your money! Always new . . . custom built . . . they eliminate drippage, and the vertical sides mean good savings in concrete, as well as a nice, smooth appearance.

LABOR-SAVING! Jay-Pans are tailored for any job, and when cutting is necessary, all that is required is a saw or pocket-knife. Sand is never placed under a Jay-Pan pour, and jobs stay on schedule because there are always enough Jay-Pans on the job site. Lightweight, easy to use, Jay-Pans end chipped floors, save both time and men!

WEATHER-RESISTANT! These are not regular "paper" pans. Jay-Pans are made of "freezurboard"—a patented, heavy-duty asphalt-impregnated material similar to asphalt roofing, which is saturated with asphalt. Millions of square feet of federal government, state, and private projects have proved the reliability of Jay-Pans under all weather conditions.

ALL SIZES! Tapered, adjustable, long-span, waffle, or cored slab, Jay-Pans give a clean job . . . come in all standard sizes as well as practically any other size you need to fit your most economical module.

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LAWRENCE PAPER COMPANY

Construction Products Division

VIking 3-8111 Lawrence, Kansas,

Materials and Labor Prices Monthly Market Quotations by ENR Field Reporters

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots cash, dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.* truckload del.* per block		CONCRETE Ready Mixed 1:2:4 del. per cy 50 cy & over
	Paper	Bulk	Mortar	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand grav.	Lt. wgt. agg.	
Atlanta	$4.33a‡	$3.93a‡	$3.59a‡	$3.10s‡	$3.10s‡	$1.85‡s	$2.18s	$2.33s	$1.65r	$1.75r	$0.175o	$0.21o	$13.75g
Baltimore	4.32a	3.91a	3.46a	2.80‡a	2.80‡a	2.25‡a	2.85‡a	2.90‡a	2.05‡a	2.00‡a	.18a	.18a	13.50ou
Birmingham	4.23c	3.30cf	..	2.53ns	2.53ns	2.13ns	2.75s	2.75s	1.65d	1.75d	.18	.18	14.00q
Boston	5.80ip	4.52ap	4.80imp	3.00qsz	3.00qsz	3.00qsz	1.75qsz	1.85qsz	....	....	.23o	.275ao	15.00q
Chicago	4.13ag	3.87ag	3.90/3.95g	3.78‡e	3.78‡be	4.13‡be	3.95‡be	3.95‡be	2.25‡e	2.25‡e	.26‡e	.26‡be	13.50e
Cincinnati	4.68c	4.16c	4.18c	2.29‡cu	2.34‡cu	2.44‡cu	2.51‡cu	2.74‡cu	1.80u	1.80u	.20o	.25ao	13.25qr
Cleveland	1.30‡	....	3.89‡ae	2.25ae	2.10ae	1.75ae	2.70fy	2.70fy	2.20‡fR	2.20‡fR	....	.23f	16.50u
Dallas	3.65a	3.25a	3.53a	2.65‡a	2.75‡a	1.90‡	2.43	2.63	....	....	....	.27	12.50x
Denver	4.79a	4.29a	4.79	1.95‡	2.15‡	1.42‡b		3.00‡x	....	....	.25	.27ao	11.90
Detroit	4.25a	3.74agq	3.72a	4.50‡abm	4.50‡abm	4.25‡abm	3.75‡abm	3.75‡abm	2.47aqaa	2.47aqaa	.22u	.25‡au	15.00aa
Kansas City	4.23a	3.83a	4.10a	....	....	1.85‡a	2.00‡a	2.00‡a	....	....	.22a	.26c	14.50
Los Angeles#‡	5.12ch	4.68ch	5.60c	2.56‡at	2.76‡at	2.41‡at	2.41‡at	2.46‡at	....	....	.19f	.305	12.46hlx
Minneapolis	4.52a	4.11a	4.08a	2.70‡ae	2.70‡ae	1.60‡ae	3.95‡ae	3.95‡ae	....	....	.19q	....	13.80f
Montreal	3.36‡de†	3.11‡de†	3.72‡de†	1.90‡a†	2.15‡a†	2.40‡a	1.90‡†	2.15‡†	2.00†	2.00†	.20†	.28t†	10.80ek†
New Orleans	4.06b	3.65b	3.85b	2.61b	2.61b	2.16b†	....	....	1.65d	1.75d	.29r	.29	14.00o
New York	4.58aR	4.18aR	3.65aR	....	3.20bkd	2.30bkd	2.85blbb	3.10blbb	....	....	.265nwo	.32bwo	17.60ay
Philadelphia	4.39‡ae	3.99‡ae	3.51‡e	1.95‡a	1.95‡a	1.55‡a	2.00‡a	2.30‡a	2.25‡a	2.25‡a	....	.225	13.90z
Pittsburgh	5.65bjk	4.62bj	5.00bjl	2.85‡aqv	2.85‡aqv	3.08‡aqv	2.00‡aqv	2.00‡aqv	2.10w	2.10w	.28r	.28r	15.80o
St. Louis##	4.34a	3.94a	4.04a	3.45‡as	3.30‡as	2.40/3.40‡as	1.75js	1.75js	....	....	.255‡o	.315‡co	13.65/14.10q
San Francisco	4.34c	3.79c	4.78c	2.02	2.02	2.12	2.17	2.17	....	....	.24	.28cl	13.00cw
Seattle	4.22‡a	3.60ag	4.40a	4.25‡bm	4.25‡bm	4.25‡bm	4.50‡bm	4.50‡bm	....	....	.324s	.45cs	13.90j
Toronto	5.00i	3.84Rt	5.00i	2.40	2.40	2.05	2.40	2.40	2.40	2.40	.26	.275cu	13.75q

‡ Delivered. * Prices incl. dealers discount except as noted. # Add 4% sales tax. ## Add 2% intrastate sales tax. R Revised. † Plus 6% Mun & Prov tax.

CEMENT: *a Less 10¢ disc. 15 days. *b Less 2% disc. 15 days. *c Less 10¢ disc. 10 days. *d 10¢ disc. 20 days. *e Truckload lots. *f Fob mill, add $14.58 to $21.31 per car switching charges. *g fob mill + freight. *h LCL. *i Less 2% disc. 10 days. *j Truck lots, fob yard. *k 100 bag lots *l over 150 sacks. *m Sold in bags only. *n Less 5% disc. 30 days. *o Plus 50¢ for Sat. del. *p 5-8 ton truckload. *q F.o.b. mill *s In bags & bbl. Only *t min. 7 tons

SAND, GRAVEL, STONE & SLAG: *a Truck lots. *b Per cu. yd. *c 5 tons up. *d Less 5¢ disc. 10 days. *e Less 2% disc. 10th. *f Less 2% disc. 15th. *g Less 5% for cash. *h Less than 5 tons. *j F.o.b. quarry. *k Barge lots asd. *l F.o.b. scow Hudson river. *m Less 2% for cash. *n F.o.b. cars. *q F.o.b. yard. *r less 5% disc. 15th. *s Less 2% disc. 10 days. *t Less 10¢ disc. 10 days. *u Less 5¢ disc. 10 days. *v Less 2% disc. 15 days. *w Less 10¢ disc. 15 days. *x Incl. 35¢ switch. charge. *y F.o.b. dock. *z 5-8 tons. *aa Less 5% disc. 15 days. *hb Less 2% 25th of mor.th

CONCRETE BLOCK: *a Cinder. *b Waylite. *c Haydite. *d Celocrete, *e 5¼ x 8 x 12 in. *f 8 x 4 x 16. *g F.o.b. truck at job. *l F.o.b. plant San Rafael. *m F.o.b. yard. *n 8 x 8 x 18. *o Less 2% disc. 10 days. *p Less 2% disc. 10th. *q Less 5% disc. 10th. *r Less 2% disc. 15 days. *s Less 2% disc. cash. *t Siporex, 7 x 8 x 18. *u Less 5% disc. 10 days. *v Less 12% disc. 15th. *w Eff. 1/1/57.

READY MIXED CONCRETE: *a 6 cu yd or over del. Man. *b 25 cu yds or more. *c 10-100 cy. *d 1-3 mi. zone add 15¢ for ea. add'l 1-mi. zone. *e 2,000 lb comp. *f 2,500 lb. comp., less 5% disc. 30 days. *g Less 25¢ disc. 15 days. *h Less 50¢ for cash. *i 5% off for cash. *j 2% off for cash. *k Federal tax included. Add 6% mun. & prov. tax. *l 1:2½:3½ base price. *m F.o.b. yard. *n Plus escalator clause. *o Less 2% disc. 15 days. *p Less 50¢ disc. 15 days. *q Less 2% disc. 10 days. Add 50¢ per zone. *r 2000 wgt. *s Less 5% disc. 10 days. *t Incl. 50¢ heating. *u Less 2% disc. 15th. *v Sat. del.+50¢. *w 10-100 cy. *x Del in zone 20-B. *y less 25¢, 10 days. *z less 1% in 30 days. *aa 6 bag mix

CURRENT MAXIMUM PRICES AT CEMENT MILLS: Subject to 10¢ discount, 15 days. For paper bags add 40¢ per bbl., not refundable.

	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City, Tenn	$3.45#	Buffington, Ind	$3.40#	Steelton, Minn	$3.45#	Muskegon, Mich	$3.45#	Toledo, O	$3.45#
Clinchfield, Ga	3.45#	Independence, Kan	3.25#	Leeds, Ala	3.30#	Saginaw, Mich	3.45#	Milwaukee, Wis	3.50#
Kingsport, Tenn	3.45#	Hannibal, Mo	3.35#	Duluth, Minn	3.45#	Wyandotte, Mich	3.45#	Green Bay, Wis	3.50#
West Des Moines, Iowa	3.50#	Northampton, Pa	3.50#	Hudson, N. Y.	3.50#	Buffalo, N. Y	3.55#	Ironton, O	3.45#
Nazareth, Pa	3.50#	Universal, Pa	3.60#	Alpena, Mich	3.35#	Oswego, N. Y	3.60#	Montreal City	2.56#
Bath, Pa	3.50#	Waco, Tex. (+ 10¢ tax)	3.35#	Detroit, Mich	3.45#	Cleveland, O	3.50#	W. Winfield, Pa	3.60#
Lesley, Pa	3.50#	Giant, S. C	3.45#	Howes Cave, N. Y	3.50#	Alsen, N. Y.	3.50#	Security, Md	3.50#

# Price guaranteed through December 31, 1959

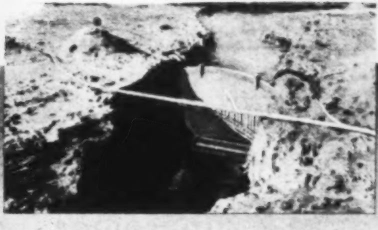
PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT Per ton, less than 80 penetration		ASPHALT BINDERS—FLUXES Per gal., 80-300 penetration		CUTBACK ASPHALT MC per ton		ROAD OIL Per gal.	ASPHALT EMULSION RSI Per gal.	
	Granite Per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	e	e	e	$28.60PS	$45.00PS	$0.2740PS	$0.235S	$0.1375wS	$0.245wS	$0.1325S	$0.1325S	$0.245
Baltimore	e	e	e	21.00i	....	.09i	0.18i	.09iwE	.18iwE	.095	.10i	0.19i
Birmingham	....	66.00i	....	25.12	25.69O	.1069	0.1093O	.1162w	.1188Ow	.1006O	.1069	0.1093O
Boston	....	....	....	22.00apS	46.00apS	22.00anS	46.00anS	.165awF	.22awF	.14aOR	.15OR	....
Chicago	150.00‡a	95.00‡ab	3.95/4.00‡aj	22.00b	32.00b	20.40bv	30.40bv	.10bwH	.18bwH	.08b	....	....
Cincinnati	....	....	....	26.00SU	....	26.00ff	....	.1165wSU	....	.109	.1265	....
Cleveland	....	89.50‡d	6.30	26.00tA	....	26.00tvA	....	.1115twAF	....	....	.1180tA	.21A
Dallas	e	40/80p	e	26.90	46.35	.1138	.1983	30.50	52.45	.1100	.1138	.1983
Denver	....	62.00a	....	....	....	....	....	....	....	....	....	....
Detroit	....	116.00	....	30.90R	....	31.00vR	....	.1342wIR	....	.1000	....	.28
Kansas City	e	e	e	18.00cl	....	18.00cv	....	.0825cwJ	....	.079c	0.125c	....
Los Angeles#	e	e	e	21.50dmx	....	21.50dvx	....	23.00dKx	....	22.00dvaa	23.90jXv	26.30jXv
Minneapolis	....	....	3.73h	25.00	....	26.00v	....	10.115w	....	0.105	.1375bb	....
Montreal	e	e	e	30.50n	43.60n	.167n	.211n	17.80nuE	22.20nuE	.155n	.242n	.27nX
New Orleans	e	e	e	20.00e		20.00ev	....	.095ew	....	.085eB	.095eBL	.1905eB
New York	....	....	3.70f	23.99mO	45.94mO	23.99vtO	45.94vtO	10.61uF	20.01uF	....	10.68u	20.11u
Philadelphia	175/185	....	....	18/21U	....	18/21U	....	0.085/.10FU	....	0.085/.10U	....	....
Pittsburgh	60.00k	95.00n	6.35n	31.20is	....	31.20isv	....	.1403‡S	....	.14‡S	.1403i	....
St Louis##	....	....	....	19.74f	21.19	.1825f	.1825	.080f	.092fw	0.165f	.1825O	.30R
San Francisco	....	70.00	....	22.50gdd	41.00gdd	22.50gkvdd	41.00gkvdd	22.50gNdd	46.50gNdd	23.25gvWdd	23.50gvXdd	20.23gXdd
Seattle	....	....	....	25.00z	40.00h	25.50vscc		26.50KE	....	24.25hvY	23.50hvX	45.10hrvX
Toronto	....	135.50f‡	4.50f	41.50	61.28ee	0.2075	0.2773ee	0.222w	0.2704wee	0.233	0.218Zee	.273Zee

‡ Delivered. # Add 4% sales tax. ## Add 2% intrastate sales tax. R Revised.

PAVING BRICK & BLOCK: *a Less 2% disc. 10th. *b 3 x 3¾ x 8. *c 2¼ x 8¼ x 4. *d Truckload lots. *e Not used. *f 2" interior 6 lb tr. *g Less $1/Mdisc. 15th. *h 2" tr, 8 lb. *i 3 x 3⅝ x 8½. *j 2½", 6 lb. tr. *k Used. *l Redshale. *m Pine: oak $6.57. *n Truck del. *o Less $1/M disc. 15 days. *p Used: $40; new: $80.

ASPHALTS: *a F.o.b. refinery, Everett, Mass. *b F.o.b. refinery, Lockport, Ill. *c F.o.b. Sugar Creek, Mo. *d F.o.b. refinery, El Segundo. *e F.o.b. Baton Rouge. *f F.o.b. Hartford, Ill. *g F.o.b. refinery, Richmond, Calif. *h F.o.b. Martinez. *i F.o.b. refinery, Baltimore. *j F.o.b. refinery, Inglewood, Calif. *k 50-110 penetr. *l Less than 100 penetr. *m 40/300 penetr. *n F.o.b. refinery, Montreal. Fed. tax included; add 6% for mun. & prov. *o Drums not avail. Shipped in steel bbl. *p 60/70 penetr. *r In customer's drums. *s Shipped in drums, per drum. *t 150 300 penetr. *u Per 100 gal. *v Per ton. *w Per gal. *x Also tank trucks *y F.o.b. Oakland. *z F.o.b. Edmonds. *A F.o.b. refinery, Cleveland, *B F.o.b. Destrehan, La. *E RC. *F Also RC. *G Also MS *H RC 0-5 incl. *I MC 4. *J MC, RC $0.095. *K MC 3, 4, & 5. *L MS. *M MC 1-5, RC 1-5, $0.0918. *N MC 3. *O Truckload. *P F.o.b. refinery, Atlanta. *Q F.o.b. Eldorado, Ark. *R Delivered within 50 mi. *S Less 2% disc. 10 days, net 30. *T Less 1% disc. 10 days. *U F.o.b. refinery. *V Less 2% disc. 15 days. *W SC 2. *X RS 1. *Y SC 1. *Z Incl. 10% Sales Tax. *aa SC 3, 4, & 5. *bb RS 3. *cc In used drums. *dd less disc of $1 ton. ee 45 Imp. gal. drums *ff 60-150 penetration



Artist's conception of completed Glen Canyon Dam and bridge.

New steels are born at Armco

▲ It's hot, dusty and windy around this main office and administration building of Merritt-Chapman & Scott at the Glen Canyon Dam. But this Armco Building has all the modern conveniences and interior finish to make it comfortable and attractive.

HOW GLEN CANYON CONTRACTOR USES ARMCO STEEL BUILDINGS

Merritt-Chapman & Scott Corporation, New York, prime contractor for the Bureau of Reclamation's $108,000,000 Glen Canyon Dam in northern Arizona, has many Armco Steel Buildings at this construction site.

One interesting application is that of an L-shaped administration building, providing 9,000 square feet of office space. Because of frequent hot weather and dust-laden winds, the entire structure is air-conditioned.

Other Armco Buildings at this location include a power house structure, metals warehouse, tire storage and repair shop, and two twin-barracks for construction personnel—an additional 43,000 square feet of floor space.

At another big construction site—the Niagara Power Project in New York—Merritt-Chapman & Scott also has a number of Armco Buildings—some similar to those at Glen Canyon. These buildings, at both sites, were erected by Armco's Construction Department.

It will pay you to consider these buildings for *your* construction projects. Send coupon for free book on Armco Buildings. Armco Drainage & Metal Products, Inc., 5119 Curtis Street, Middletown, Ohio. In Canada: Guelph, Ontario.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
5119 Curtis Street, Middletown, Ohio

☐ Send me the free book on "Armco Buildings for Construction Projects"

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Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, MARIE MORAVSIK, ELAINE CHOMYAK, ELIZABETH WERRA, ELEANOR QUERET, Reports, J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

N. H., Keene—BA 9/14—City, 3 Washington St., sewer interceptor Park and Maple Aves., West Keene. $544,000. Plans deposit $10. Camp, Dresser & McKee, 6 Beacon St., Boston, Mass., engrs. CD 4/23.

Conn., Stamford—BA 9/15—City, City Hall, slab facilities bldg. East Beach, Cove Island. $90,000. Sternbach & Rheaume, 305 Atlantic St., archts. Muzzillo & Tizian, 567 Summer St., engrs. CD 4/15.

R. I., Woonsocket—BA 9/16—City, City Hall, Contr. 56/57-10, sewers force mains and sewage pumping station. $280,000. Plans deposit $25. Metcalf & Eddy, Statler Bldg., Boston, Mass., engrs. CD 1/29.

† **R. I., Newport**—ELEVATORS AND TOWERS—BA 9/23—Dist. P. Wks. Office, 1st Naval Dist., Bldg. 37, 495 Summer St., Boston, Mass., repairs to submersible torpedo tube elevators and towers Gould Island, U. S. Naval Underwater Ordnance Station, NBy 24896, Spec. 24896/59. $25,000-$100,000. Plans deposit $25. CD 8/27/56.

† **Me., Topsham**—OFF-SITE FACILITIES—BA 9/24—U. S. Eng., Topsham Air Force Station, Brunswick, Me., off-site facilities and related work, 177 units armed services housing, Topsham Air Force Station, IFB 17-612-60-1.

BUILDINGS—BA

R. I., North Providence—SCHOOL—BA 9/15—Town, 1828 Mineral Spring, elementary school, Woodward Rd. $400,000. Plans deposit $100. Alfred Kozar and Charles G. Everett, 7 Dyer St., Providence and 4 Baptist St., Pawtucket, archts. CD 7/16.

† **Mass., Watertown**—LABORATORY, etc.—BA On Or About 9/24—U. S. Eng., 187 Westminster St., Providence, R. I., dividing area of existing Bldg. 97 into laboratory and other related spaces, Watertown Arsenal, ENG-19-016-60-17. $200,000-$300,000. Plans deposit $10.

▲ **Mass., Winchendon**—SCHOOL—BA 9/24—Town, junior-senior high school, Grove St. and Murdock Ave. $1,285,996. Plans deposit $100. Perley F. Gilbert & Assoc., Inc., Sun Bldg., Lowell, Mass., archt. CD 2/2.

HEAVY CONSTRUCTION—LB & CA

NEW HAMPSHIRE—Dpt. P. Wks. & Hys., Concord,

R. G. Watkins & Son, Inc., Millyard, Amesbury, N. H., CA **$945,717,** hot b. conc. roadway 2.461 mi. NH 101, Exeter and Stratham, Rockingham Co. Bids July 9. CD 7/17, under LB.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Suburban Excavators, Inc., 4 New Salem St., Wakefield, Mass., CA **$2,343,350,** est. $2,881,398. State Hy. and bridge constr. Interstate Rte. 495, FA Proj. 1-495-6(1) 60, Westford. Bids Aug. 4. Awarded Aug. 24. CD 8/6, under LB.

BUILDINGS—LB & CA

▲ **Paul B. McLellan Co.,** 52 Marginal Way, Portland, Me., CA **$1,021,514,** CLASSROOMS, LABORATORY and LIBRARY, Campus, PORTLAND, ME. University of Maine, in Portland, 23 Brighton Ave., Portland, Me. Bids Aug. 14. CD 8/18, under LB.

▲ **Theodore Loranger & Sons,** 404 Nash Rd., New Bedford, Mass., CA **$1,401,873,** est. $1,425,000, Mass. 60-C-201 A10, SENIOR HIGH SCHOOL near Waterhouse Rd., BOURNE, MASS. Town, Supt. Schools, Senior High School, Buzzards Bay, Mass. Bids July 29, awarded Aug. 24. CD 8/3, under LB.

▲ **John Zandonella, Inc.,** 70 Chase St., Bridgeport, Conn., CA **$1,426,000,** two 4 story DORMITORIES, Proj. No. Conn. 6-CH (D), BRIDGEPORT, CONN. University of Bridgeport, 200 Park Place, Bridgeport, Conn. Bids Aug. 11. CD 8/19, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

Pa., Phila.—BA 9/15—Dpt. Procurement, City Hall Annex, Bid 2380 constr. water mains, Maxwell St. etc., Bid 2381, water main, Kensington Ave. from Huntingdon St. to Lehigh Ave., Bid 2377, water mains, Wharton St. (South Side) from 35th St. to Warfield St. Date (Bid 2377). CD 8/25. All previous foregoing CD 11/8.

New York—BA 9/17—Henry A. Cohen, dir., Bureau Contracts, State Office Bldg., Albany, Contr. US 99, lowering gates, replacing lower sill and other misc. work upper sill, Erie Barge Canal, Lock 19, Herkimer Co. Plans deposit $10.

Md., Glen Burnie—BA 9/23—Anne Arundel Co. Sanitary Comn., 300 Baltimore and Annapolis Blvd. N.W., furnishing one new current 1959 production duplex pneumatic sewage ejector. CD 2/24/56. ENR adv. 9/1.

BUILDINGS—BA

N. J., Fair Lawn—PLANT—BA About 9/15—Wah Chang Corp., Industrial Ave., Little Ferry, 40,000 sq. ft. plant, Rte. 17, Industrial Park tract, $400,000. Wigton Abbott Corp., 1225 South Ave., Plainfield, archt.

† **Md., Aberdeen Proving Ground**—HUMAN ENGINEERING LABORATORY—BA 9/18—Procurement Branch, Aberdeen Proving Ground, bldg. 520 modification for Human Engineering Laboratory. IFB 60-22. CD 9/5/58.

N. J., Englewood—SCHOOL—BA 9/29—City, City Hall, junior high school and auditorium, $3,500,000. Licht & Johnson, 19 Knickerbocker Rd., archts. CD 3/11/58.

HEAVY CONSTRUCTION—LB & CA

NEW YORK and ONTARIO—State Dpt. P. Wks., State Office Bldg., Albany, bids opened 8/27.

N. Y.—Dibblee Const. Co. Ltd. Ottawa 4, Ontario, Can. LB **$318,493.50** LB est. $362,000, (3 bidders), b. conc. type 1A pavement 0.43 mi. Ogdensburg Bridge, Canadian Approach Roadway, Grenville, Ontario, Canada. OBA 59-6. CD 7/28.

Frank P. Dyer, 2438 Maryland Ave., Baltimore 18, Md., LB **$247,658** (3 bidders), bldgs. imprvs. Montebello Filtration Plants Nos. 1 and 2, BALTIMORE, MD. City, Bureau of Water Supply, 505 Municipal Bldg., Baltimore 2, Md. Bids Aug. 26. CD 8/13.

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton,

Yonkers Contracting Co., 969 Midland Ave., Yonkers, N. Y., CA **$5,333,902,** grading, paving and bridges 1.985 mi. Rte. 287, Sect. 1B, from US Rte. 22 interchange to viaduct at Lehigh Valley Railroad, Bridgewater Twp. Somerset Co. Bids July 31, awarded Aug. 25. CD 8/4, under LB.

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton, Bids opened 8/26,

Glasgow, Inc., Glenside, N. J., LB **$1,018,821** (6 bidders), intersection imprvs., turning ramps and island closings on 6.043 mi. stretch of US Rte. 130, Sects. 8A and 9A, from Coopertown Rd. to Cinnaminson Ave., Burlington Co. CD 8/7.

▲ **Joseph Lombardi & Sons,** 1311 South Broad St., Phila. 47, Pa. CA **$1,388,796.** Bid 2331, Wakeling St. relief sewer, stormwater conduit and relay of water mains, Vankirk St. between the Delaware River and Edumund St. PHILA. PA. Dpt. Procurement, City Hall Annex, Phila. Pa. Bids Aug. 18. CD 6/30.

BUILDINGS—LB & CA

▲ **Werner Spitz Constr. Co.,** 11 Comfort St., Rochester, N. Y., LB **$1,446,658,** general contract HIGH SCHOOL, State St., BATAVIA, N. Y. Bd. Educ., Batavia, N. Y. Bids Aug. 20. CD 7/16.

▲ **Mahony-Troast Constr. Co.,** 790 Bloomfield Ave., Clifton, N. J., CA, rein.-con. Reactor Bldg., rein.-con. steel and glass Radio-Active Materials Laboratory, high density concrete stall for Nuclear Reactor, 5 cells for Radio Active Materials, RESEARCH Center (2nd Section), STERLING FOREST, N. Y. Union Carbide Nuclear Co. Div. Union Carbide Corp. 30 E. 42nd St., New York 17, N. Y. Osborn Engineering Co., 7016 Euclid, Cleveland, O., engr.

▲ **Frank Briscoe Co., Inc.,** 287 South 19 St., Newark, N. J., CA Est. **$20,000,000,** RESEARCH AND DEVELOPMENT bldg., HOLMEEL, N. J., Bell Telephone Laboratories Inc., 463 West St., New York 14, N. Y. CD 4/21.

▲ **Taylor International Corp.,** 420 Lexington Ave., New York, N. Y., CA Est. **$20,000,000,** three 20 story APARTMENTS, stores, playgrounds, parking, JERSEY CITY, N. J., Gregory Park, Inc., c/o contractor. John H. Graham, 444 5 Ave., New York, N. Y., archt. CD 9/16/57, under Public Buildings.

▲ **Arthur Venneri Co.,** 300 North Ave. E., Westfield, N. J., CA **$1,823,200,** est. $1,800,000, BIOLOGY, NEW BRUNSWICK, N. J. Rutgers University, College Ave., New Brunswick, N. J. Bids July 28. CD 7/13.

▲ **John McShain, Inc.,** 17th and Spring Garden Sts., Phila., Pa., LB **$6,114,000,** general constr. INSTITUTION for mentally retarded children, Phase I, Western Pa. School and Hospital, CANONSBURG, PA. General State Auth., 18th and Herr Sts., Harrisburg, Pa. Bids Aug. 26. CD 8/7;

Limbach Co., 521 Pressley St., Pittsburgh, Pa., LB **$1,679,000,** heating and ventilating for institution (Canonsburg, Pa.);

Daniel J. Keating Co., 3917 Baring St., Phila., Pa., LB **$993,000,** plumbing for institution (Canonsburg, Pa.);

Reno Electric Co., 1006 Merchant St., Ambridge, Pa., LB **$689,733,** electrical work for institution (Canonsburg, Pa.).

▲ **Matthew Leivo & Sons, Inc.,** L S & T Bldg., New Castle, Pa., CA **$1,407,500,** SECONDARY SCHOOL for Union Twp. School Dist., Union Twp., Proj. 802-535, NEW CASTLE, PA. Pa. Pub. School Bldg. Auth., 101 S. 25th St., Harrisburg, Pa. Bids July 23. CD 7/30, under LB.

▲ **Webb & Knapp, Inc.,** 270 Park Ave., New York 17, N. Y., Owner Builds, Est. **$10,000,000,** three 14-20 story APARTMENTS, south side of Wylie Ave. Lower Hill Distr., PITTSBURGH, PA. I. M. Pei Assocs., 270 Park Ave., New York 17, N. Y., archts. D. K. Richey, Clark Bldg., assoc. archt.

▲ **Victor R. Beauchamp,** 431 Cedar St. N.W., Wash., D. C., LB **$2,492,218** (6 bidders), Bernadine Sisters HIGH SCHOOL (La-Reine School), 4900 Silver Hill Rd., SUITLAND, MD. Archdiocese of Washington, 1721 Rhode Island Ave. N.W., Wash., D. C. Bids Aug. 27. CD 8/21.

▲ **John Tester & Son,** Clinton, Md., CA **$1,521,217,** Beltsville JUNIOR HIGH SCHOOL, Beltsville, MARLBORO, MD. Prince George's County Bd. Educ., Marlboro, Md. CD 8/21, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

Ala., Birmingham—BA 9/22—Jefferson Co. Courthouse, Powderly branch sewerage system addn., $200,000 R. C. Barton Co. Sanitary Engr. Courthouse, Engr.

† **N. C., Cherry Point**—STEAM AND CONDENSATE LINES—BA 9/22—Dist. P. Wks. Office, Fifth Naval Dist., Rm. 307, Bldg. N-26, U. S. Naval Base, Norfolk, Va., steam and condensate lines repair, Marine Corps Air Station, NBy 24371. Spec. 24371-59. $100,000-$250,000.

† **Louisiana**—BA 9/23—U. S. Eng., foot of Prytania St., New Orleans, La., restoration and riprap slope pavement Item M-21.6R, Lower Childress levee, Plaquemine Parish. Inv. 60-43.

† **Mississippi**—BA 9/25—Soil Conservation Service, Dpt. of Agriculture, New Albany, Miss., Constr. 4 earthfill floodwater retarding dams at sites LT-1a-1, LT-1a-2, LT-1a-10 and LT-1a-11, Greasy Creek, Panola Co., Little Tallahatchie River Watershed for U. S. Dpt. of Agriculture, Soil Conservation Service, P. O. Box 610, Milner Bldg., Jackson, Miss. Report No. MS-7.

† **Florida**—BA 10/1—U. S. Eng., 575 Riverside Ave., Jacksonville, maintenance dredging, turning basin, Miami Harbor, CIVENG-08-123-8. CD 11/24/43.

▲ **N. C. Forest City**—BA 10/1—Town, Town Hall, 1 m.g. sewage treatment plant, pumping stations, sewer lines, $1,000,000. Plans deposit $45. Harwood Beebe Co., E. Main St., Spartanburg, S. C., engr. CD 10/30.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000, other public works $88,000, industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	**Middle West**
Middle Atlantic	**Mississippi to Rockies**
South	**Far West**

PROPOSED WORK

Water Supply	**Public Buildings**
Sewers, Waste Disposal	**Mass Housing**
Bridges	**Commercial Buildings**
Streets & Roads	**Industrial Buildings**
Earthwork, Waterways	**Unclassified**

In These Stages

PROPOSED WORK: **Before and including appointment of engineers or architects.**

BIDS ASKED: BA **(new announcements only). For full calendar, see also preceding issues.**

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB **On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.**

CONTRACTS AWARDED: CA **Except awards to low bidders previously reported in low bidder stage.**

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS **are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.**

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see **Construction Daily.**

† **S. C., Beaufort** — LANDSCAPE TREATMENT — BA 10/7—Dist. P. Wks. Office, Bldg. 13, 6th Naval Dist., U. S. Naval Base, Charleston, landscape treatment, Marine Corps Aux. Air Station, NBy 21134. Spec. 21134/58, under $25,000. CD 9/8/58.

BUILDINGS—BA

Fla., Miami—SCHOOL—BA 9/16—Dade Co. Bd. P. Instruction, Admin. Bldg. 275 NW 2 St., Honey Hill Junior High School NW 195 St. and 12 Ave. Plans deposit $50. Steward-Skinner, Assocs., DuPont Plaza Center, archts., Elementary School West Homestead. Plans deposit $50. F. H. Shuflin, Assocs., DuPont Plaza Center, archts. CD 8/27.

▲ **N. C., High Point**—OFFICE— BA 9/16—City and Guilford Co., City and Courthouse, city-county office $1,000,000. Plans deposit $50. Voorhees & Everhart, 658½ N. Main St., archts. CD 6/15.

† **Tenn., Nashville** — OFFICE SPACES — BA 9/16 — General Services Admin., Region 4, 50 7th St., N. E., Atlanta, 23, Ga., remodeling office spaces, Federal Office Bldg., DC 4-2654A.

La., Baton Rouge—PHYSICS BLDG.—BA 9/22—Louisiana State University, Baton Rouge, 4 story and part 1 story 38,400 sq. ft. rein.-con. frame, brick, concrete block and stucco Physics Bldg. addn. Plans deposit $50. Peyton-Fisher-McKelvy, Continental Bank Bldg., Shreveport, La., archts. CD 8/7/58.

▲ **S. C., Lake City**—HOUSING—BA 9/24—Lake City Housing Auth., 102 housing units $1,000,000. Plans deposit $50. James M. Hunt, P. O. Box 710, Elberton, Ga. archt. CD 6/25.

▲ **Fla., Fort Pierce**—COURTHOUSE AND JAIL—BA 10/7—St. Lucie County Bd. Comrs., Courthouse, courthouse and jail, $1,500,000. J. Gamble Rogers, Lovelock & Fritz, 145 Lincoln Ave., Winter Park, archts. CD 4/24/58.

La., Berwick—CRUSHING PLANT, etc.—BA 10/8—Bd. Comrs. Morgan City Harbor and Terminal Dist., City Hall, oyster shell crushing plant and anciliary services. Plans deposit $100. Gulf Federated Consultants, Inc., Berwick, La., engr.

BUILDINGS—SLC

▲ **Ala., Birmingham**—WAREHOUSE—A & P Food Stores, 420 Lexington Ave., New York, N. Y., soon lets contracts 182,300 sq. ft. warehouse, cold storage units and offices 1 Ave. N. between 35 and 37 Sts. $1,500,000 J. N. Pease & Co., 119½ E 5 St., Charlotte, N. C. archts.

HEAVY CONSTRUCTION—LB & CA

▲ **SOUTH CAROLINA**—State Hy. Dpt., Hotel Wade Hampton, Columbia,

Robert E. Lee & Co., Inc., P.O. Box 417, Manning, S. C., CA **$1,519,764**, drainage, etc. 9.051 mi. Int. Rte. 26, S.C. Docket No. 8.353, FA. Proj. I-26-4 (1) Berkeley Co. Bids July 14. CD 7/22, under LB.

Hodgson-Blake Inc., 1551 Highland Ave., Montgomery, Ala., and **M. R. Thomason**, Birmingham, Highway, Montgomery, Ala., LB **$573,612** (3 bidders) concrete cover 0.75 mi. over storm drainage ditch from Elliott to Union St., MONTGOMERY, ALA. City, City Hall, Montgomery, Ala. CD 4/14.

▲ **FLORIDA**—State Road Dpt. Rm. 288, Holland Bldg., Tallahassee, Bids opened 8/25,

F & C Industries, Inc., and George E. Bunnell, Inc., Ojus, Fla., LB **$3,764,907**, extra-heavy grading, 6 and 8 lane divided 9 in. cement concrete pavement limerock base with b. conc. surf. course limerock base with type 1-A surf. tr., 580 lin. ft. rein.-con. cantilever retaining walls, founded on prestressed conc. piling 14 grade separation bridge (overall length 4,372 ft.) concrete slabs on prestressed concrete beams supported on concrete piers founded on prestressed concrete piling drainage structures, roadway lighting, fencing, aluminum handrail, 0.574 mi. SR 9 in Miami between N. W. 38 and N. W. 48 Sts. ramp connections to Proj. I-195-1(13)5 FAI Proj. No. I-95-1(14)5 Job No. 87270-3412. CD 8/4.

▲ **Delta Constr. Co.**, Box 1066, Jackson, Miss., CA **$1,176,876**, site preparation, grade, drain for runways taxiways, aprons, approach clearing, etc. JACKSON, MISS. City, Airport Comn., "City Hall" Jackson, Miss. E. B. Cavallo & Assocs., Barnett Bldg., Jackson, Miss. and Michael Baker Jr., Inc., 3957 Northview Dr., Jackson, Miss., engrs. Bids July 22. CD 8/17, under LB.

BUILDINGS—LB & CA

▲ **T. A. Loving & Co.**, Wachovia Bank Bldg., Goldsboro, N. C., LB **$1,036,850**, 70,000 sq. ft. CLASSROOM BLDG., RALEIGH, N. C. North Carolina State College, Hillsboro St., Raleigh, N. C. Bids Aug. 19. CD 8/3.

▲ **A. R. Briggs Constr. Co.**, 526 Arch St., Macon, Ga., LB **$2,863,000** 6 mens' and womens' DORMITORIES, University of Georgia, ATHENS, GA., University System Building Auth., 244 Washington St., S. W. Atlanta, Ga. Bids Aug. 25. CD 7/13.

▲ **Charles Massell**, 40 Pryor St., S. W., Atlanta, Ga., CA **$2,000,000**, OFFICE 1375 Peachtree St. N. E., ATLANTA, GA., Massell Companies, 40 Pryor St., S. W., Atlanta, Ga.

▲ **Beers Constr. Co.**, 70 Ellis St., N. E., Atlanta, Ga., CA **$2,000,000** fabrication bldg. and WAREHOUSE addns., MACON, GA., Armstrong Cork Co., W. Liberty St., Lancaster, Pa.

Rives E. Worrell Co. Inc., 2506 Drayton St., Savannah, Ga., CA **$757,000**, 85 HOUSING units THOMSON, GA. City Housing Auth., Courthouse, Thomson, Ga. Bids Aug. 11. CD 8/21, under LB.

▲ **Sylbern Constr. Corp.**, 1731 NW 183 St., Miami, Fla., separate contracts, **$1,900,000.** 160 RESIDENCES, MIAMI, FLA.

▲ **Paul Smith Constr. Co.**, 4936 Kuhl Ave., Orlando, Fla., LB **$1,045,000**, CHURCH E. Pine St. and Rosalind Ave., ORLANDO, FLA. First Baptist Church E. Pine St. and Rosalind Ave., Orlando, Fla. Ivey & Cook, 110 Candler Bldg., Atlanta, Ga., archts. CD 8/23/58.

▲ **Ebasco Services, Inc.**, 2 Rector St., New York, N. Y., CA **$30,000,000**, design and construct 300,000 kilowatt Riviera power plant addn., WEST PALM BEACH, FLA. Florida Power & Light Co., 25 SE 2 Ave., Miami, Fla. CD 2/20/53.

▲ **Refinery Engineering Co.**, 108 J. Trenton St., Tulsa, Okla., CA **$2,000,000**, design and construct automatic methane purification PLANT, LeMOYNE, ALA. Stauffer Chemical Co., 382 Madison Ave., New York, N. Y.

Lummus Co., 385 Madison Ave., New York, N. Y., CA design and altering ACETYLENE DERIVATIVES PLANT, CALVERT CITY, KY. General Aniline & Film Corp., Dyestuff & Chemical Div., 230 Park Ave., New York, N. Y.

▲ **The Lummus Co.**, 2707 Weslayan Ave., Houston, Tex., CA PETROCHEMICAL PLANT, LAKE CHARLES, LA. Continental Oil Co., 1300 Main St., Houston, Tex.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

Ill., Chicago—LIGHTING—BA 9/16—Dpt. Purchases, City Hall, Zone 2, No. 9-59-56, street lighting, $90,000. Lloyd Johnson, City Hall Zone 2, ch. engr. CD 7/1.

Ind., Thorntown—BA 9/16—Bd. Trustees, Town Hall, sewers and oxidation plant, 19,915 lin. ft. 8 in. sewer 16.7 acres oxidation pond, 2 lift stations, 72 manholes, $225,000. Plans deposit $25. Carl M. Anderson, 730 E. Elm St., Lebanon, engr. CD 8/13.

Ind., Hammond—BA 9/17—Sanitary Dist. of Hammond, 5143 Columbia Ave., Div. 26, outlying sys. imprvs., storm water pumping equipment, Item No. 2601. Bids July 16 rejected. CD 6/25; Div. 27B and 28, intercepting and storm sewers, Robertsdale (contractor refused contract). CD 8/26, under CA.

BUILDINGS—BA

▲ **O., Cincinnati** — DORMITORY — BA 9/22 Hebrew Union College, 3101 Clifton Ave., Cincinnati, 4 story, brick, rein.-con. dormitory remodeling and addn., $1,000,000. Plans deposit $75. Howard Elliston, 706 Walnut, Cincinnati, archt. Hall, McAllister-Stockwell, 706 Walnut, Cincinnati, engrs. CD 4/30.

HEAVY CONSTRUCTION—LB & CA

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield,

Ill.—**Eric Bolander & Co.**, Winchester Rd., Libertyville, Ill., CA **$1,187,361**, grade separation Cass Ave. over US 66 south of Westmont, DuPage Co.

Ill.—**Hoeffken Brothers Inc.**, 222 West B St., Belleville, Ill., CA **$689,707**, 2 grade separation structures carrying FAI-70 over Ill. 157 near Collinsville, Madison Co. Bids July 24. CD 7/28, under LB.

▲ **Arcole Midwest Corp.**, 3225 Main St., Skokie, Ill., LB **$1,856,027**, No. 0102.5, grade separation, Northwest Expressway, E. River Rd. to Soo Line Airport Lead, CHICAGO, ILL. Bd. Comrs. Cook Co., County Bldg., Chicago 2, Ill. Bids Aug. 18. CD 1/5/59.

▲ **Robert R. Anderson Co.**, 4550 W. Patterson St., Chicago, Ill., LB **$2,925,027**, No. 1012, grading, paving Northwest Expressway, Montrose Ave. to Central Ave., CHICAGO, ILL. Bd. Comrs. Cook Co., County Bldg., Chicago, Ill. Bids Aug. 18. CD 12/23;

Rock Road Constr. Co., 5915 N. Rogers Ave., Chicago, Ill., LB **$121,467**, No. 1417.1, bit. paving shoulders Northwest Expressway, Normandy Ave. to E. River Rd. (Chicago, Ill.).

Ready Paving & Constr. Co., 4911 S. Shields Ave., Chicago, Ill., CA **$88,532**, bit. paving .55 mi. Sections 22 and 22.1-cs OAK LAWN, ILL., Village, Village Hall, Oak Lawn, Ill. Bids June 27. Awarded July 27.

Robert Beddle & Sons, 8561 Arborcrest, Amberley Village, O., LB **$166,498** (6 bidders), Huntley Road Sanitary trunk sewer, CINCINNATI, O. Bd. Comrs., Hamilton Co., Courthouse, Cincinnati, O. Bids Aug. 18. CD 6/18.

▲ **Calumet Constr. Co.**, 1247 169 St., Hammond, Ind., CA **$1,190,896** (5 bidders), Div. 25; CA **$289,058**, (3 bidders), Div. 29. HAMMOND, IND., Sanitary Dist. of Hammond, 5143 Columbia Ave., Hammond, Ind. Bids July 16. Grand total $2,694,408. CD 7/22, under LB.

R. G. Mattern, Inc., P.O. Box 85, Roosevelt Station, Dayton 17, O., CA **$437,198**, imprv. East Dayton Storm Relief, State I, Part II, Foraker St. and Burns Ave. from Brady St. to west side of Old Market House, Wayne and Burns Aves., DAYTON, O. Dpt. Service & Bldgs., Rm. 500, Municipal Bldg., Dayton, O. Bids July 30. CD 7/21.

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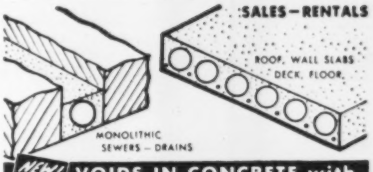

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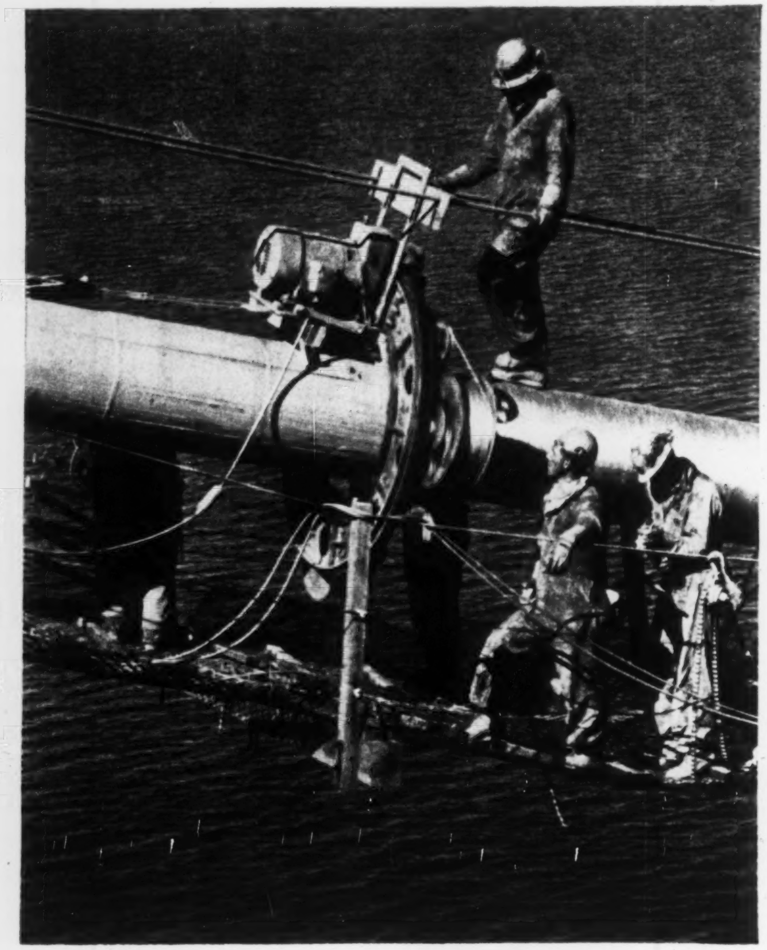

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John Erskine Co., 9259 N. Laramie, Skokie, Ill., LB **$188,800,** water works filtration plant addns., KENILWORTH, ILL. Village, Village Hall, Kenilworth, Ill. Bids Aug. 20. CD 7/30.

WISCONSIN—State Hy. Comn., State Office Bldg., Madison,

Stoehr Grading Co., Waukesha, Wis., CA **$963,429,** grade, subbase and structures B-67-59 and C-67-19, 3.201 mi. Madison-Milwaukee Rd. (Calhoun Rd.-East County Line Sect.), Interstate Hy. 94, Contr. 1, Proj. I-94-3(14)298, Waukesha Co. Bids July 7. CD 7/13, under LB.

BUILDINGS—LB & CA

▲ **Frank Heinz Constr. Co.,** 2506 S.W. Adams, Peoria, Ill., CA Est. **$1,000,000,** 1 story, 140,000 sq. ft. WAREHOUSE AND COFFEE ROASTER PLANT, Expressway and Rte. 150, EAST PEORIA, ILL. Chris Hoerr & Son, 1321 S.W. Washington St., Peoria, Ill. CD 5/26.

▲ **Murphy Bros., Inc.,** 7945 Hamilton, Cincinnati, O. Own Forces. **$1,890,000,** 102, 1 story, bsmnt., brick HOMES, Daly and Compton Rds., CINCINNATI, O.

▲ **General Electric Co.,** 1 River Rd., Schenectady, N. Y. CA Est. **$25,000,000,** 250,000 KW generating unit for Lake Shore GENERATING PLANT, CLEVELAND, O. Cleveland Electric Illuminating Co., P. O. Box 5000, 55 Public Sq. Cleveland 13, O. CD 5/1.

† **Graver Tank & Mfg. Co.,** Div. Union Tank Car Co., 4809 Tod Ave., East Chicago, Ind., CA 123 ft. high, 73 ft. diam. concrete dome shaped CONTAINMENT STRUCTURE for Atomic Power Plant PIQUA, O. Atomic International, Div. North American Aviation Inc., Downey, Calif. for Atomic Energy Comn. CD 6/9, under CA.

Rodgers Constr. Inc., McAdams Bldg., Springfield, O. CA **$533,000,** two units SEMINARY for Hamma Divinity School SPRINGFIELD, O. Wittenberg College, N. Wittenberg, Springfield, O. Awarded Aug. 26. CD 5/15/58.

E. H. Marhoefer, Jr., 2424 N. 25th Ave., Franklin Park, Ill., CA **$626,000,** 2 story brick STUDENT UNION, GALESBURG, ILL. Knox College, between Cherry and Cedar Sts., Galesburg, Ill. Bids Aug. 6. CD 8/21, under LB.

▲ **Refinery Engineering Co.,** 108 N. Trenton St., Tulsa, Okla., CA design and construct 3,000 b/a naphtha UNIFINING UNIT at Refinery, DETROIT, MICH. Aurora Gasoline Co., 15911 Wyoming St., Detroit 38, Mich.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲† **Colo., Colorado Springs** — OPERATIONS CENTER ROADS ETC.—BA about 9/16—U. S. Eng., 1709 Jackson St., Omaha, Neb., 4 mi. graded road, 640 lin. ft. pipe subdrains, 4,100 lin. ft. pipe culverts, 312 cu. ft. concrete for drainage structures, 33,280 lin. ft. barbed wire fence and 481 guide posts, for Norad Combat Operations Center, $2,000,000. A. J. Ryan & Assocs., 1340 Glenarm Place, Denver, assocs. engrs. CD 5/8.

† **Missouri**—BA 9/17—U. S. Eng., 300 Broadway, Little Rock, Ark., bit. surf. existing River Rd., Clearwater Dam, Black River. CIVENG-03-050-60-12B. CD 8/27.

† **Tex., Corpus Christi**—AIR CONDITIONING SYS.—BA 9/17—Officer in Charge Constr., Naval Air Advanced Training Command, Bldg. 141, Naval Air Station, renew air conditioning sys. medium range radar room hangar 58 Naval Air Station, NBy 23814. Spec. 23814/59, under $10,000.

† **Wyo., Cheyenne**—AIR BASE IMPRVS.—BA 9/17—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., water supply facilities, Site D, F. E. Warren Air Force Base, ENG-25-066-60-23. CD 1/6/58.

Mo., St. Louis County—BA 9/17—Metropolitan St. Louis Sewer Dist., 901 Washington Ave., St. Louis Zone 1, 8,000 lin. ft. 8 in. sewers, manholes, etc. Special Benefit Subdistricts 56 and 57, North Webster Trunk and North Webster Lateral Sewer; 1,400 lin. ft. 8 in. sewers, manholes, etc. Special Benefit Subdistrict 59, Lithia Ave. between Plateau Ave. and Bell Ave., St. Louis Co.; 500 lin. ft. sewers, manholes, etc. Special Benefit Subdistrict 58, Ennis Ave., Reasnor Pl., Ennis Ave.; Thornton Ave. and Emma Ave., partly in city of Rock Hill. Total est. $100,000. Plans deposit $10. CD 3/25/57.

† **Neb., Fort Crook**—ELECTRICAL DISTR. SYS.—BA 9/18—U. S. Eng., 1709 Jackson St., Omaha, Zone 2, electrical distr. sys. exten. Offutt Air Force Base, ENG-25-066-60-12. CD 8/4, under LB.

† **Missouri**—BA 9/22—U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo., public use facilities, Pomme de Terre Dam and Reservoir. IFB 60-13. CD 9/22/58.

† **Tex., Amarillo**—APRON—BA 9/22—Base Procurement Office, Amarillo Air Force Base, repair apron part VII, Amarillo Air Force Base. IFB-41-623-60-5.

† **Neb., Fort Crook**—REMODELING BLDG.—BA on or about 9/24—U. S. Eng., 1709 Jackson St., Omaha Zone 2, remodeling Bldg. 301-D, I. E. and motor maintenance complex Fort Crook, ENG-25-066-60-26. $600,000-$700,000. CD 9/11/58.

† **N. M., Las Cruces**—AUTO MAINTENANCE SHOP—BA 9/24—U. S. Eng., P.O. Box 1538, Albuquerque, auto maintenance shop, Las Cruces Air Force Base, ENG-29-005-60-23B. CD 8/25.

▲† **Iowa**—BA On Or About 9/29—U. S. Eng., 1709 Jackson El, Omaha 2, Neb., levee and channel alterations, Unit III, Sect. 2, Little Sioux River, CIVENG-25-066-60-13, $1,000,000-$2,000,000. CD 9/19/58.

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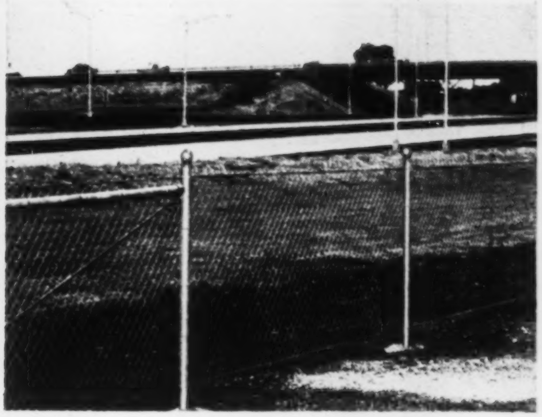

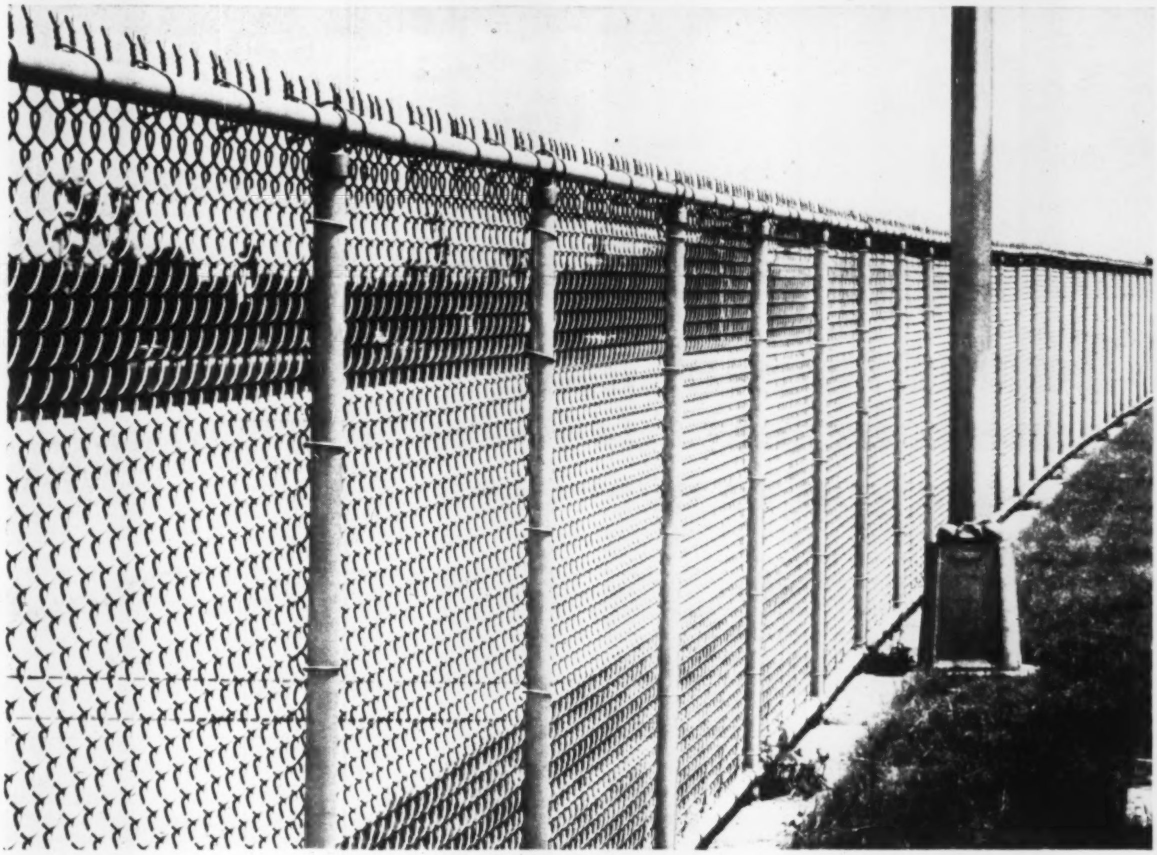

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▲† **South Dakota**—BA On Or About 9/30—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., furnishing 14.4 KV station type switch gear 13.8 KV metal clad switch gear generator neutral grounding equipment and metal enclosed isolated phase bus structures, near Pierre, Oahe Reservoir Proj. ENG-25-066-60-11. **$1,000,000-$1,500,000.** CD 9/23/58.

† **Arkansas**—BA 10/15—U. S. Eng., P.O. Box 867, Little Rock, design, manufacture, test and deliver 1 alternating current generator rated, 625 KVA at 480 volts, 3-phase 60 cycles, 0.8 power factor, 600 RPM complete with spare parts and services of an erection engineer for approx. 50 man days, Greers Ferry Dam and Reservoir, Little Red River, CIVENG-03-050-60-13 less $100,000.

BUILDINGS—BA

Mo., Mehlville (St. Louis 25 P.O.)—SCHOOLS—BA 9/14—School Dist. R-9 Bd. Educ., 3200 Lemay Ferry Rd., Zone 25, 3 story high school addn., 3200 Lemay Ferry Rd. $482,750; also Oakville and Point elementary schools addns. Wm. B. Ittner, Inc., 911 Locust St., St. Louis 1, Mo., archts.-engr. CD 8/21.

Kan., Emporia—CHURCH—BA 9/15—First Methodist Church, 118 x 278 ft. bsmnt. 114 ft. high bell tower, stone, concrete, etc. church, 800 block Merchant St. $700,000. Extended date. Buck & Lewis, 517½ Merchant St., Emporia, Kan., archts. A. Hensel Fink, 1701 Arch St., Philadelphia, Pa., archt.-consult. CD 8/17.

† **Minn., Minneapolis**—BLDGS. IMPRVS.—BA 9/17—U. S. Eng., 1217 U.S. Post Office and Custom House, St. Paul, Minn., re-roofing and roofing repairs Bldgs. 101, 102, 105, 135 and 190, Twin Cities Arsenal, ENG-21-018-60-1. CD 8/25.

Neb., Omaha—SCHOOL—BA 9/17—School Dist. 66, 8727 Shamrock Rd., Rockbrook Elementary School 108th and Gold Sts. $400,000. Leo A. Daly, 633 Ins. Bldg., archt. CD 7/20.

▲ **Tex., Nacogdoches**—STUDENT UNION—BA 9/17—Stephen F. Austin State College, Nacogdoches, 45,615 sq. ft. student union $1,000,000. Plans deposit $50. Wilbur Kent, Nacogdoches, archt., Floyd Marsellos, Nacogdoches, engr. CD 7/14.

Tex., Greenville—WAREHOUSE—BA 9/18—City, City Hall, warehouse, Majors Field $475,000. Temco, Greenville, lessee. CD 4/14/58.

BUILDINGS—SLC

Mo., Frontenac (St. Louis 24 P.O.)—STUDENTS ACTIVITIES—Ladies of the Sacred Heart, 801 S. Spoede Rd., soon lets contract, 2 story, 97x157 ft students activities bldg., swimming pool, Villa Duchesne. Plans deposit $50. Hellmuth, Obata & Kassabaum, 315 N. 10th St., St. Louis 1, Mo., archts. John P. Nix, 25 S. Bemiston Ave., Clayton 5, Mo., structural engrs. Harold P. Breham, 919 Ford Dr., St. Louis 21, Mo. engr.

HEAVY CONSTRUCTION—LB & CA

▲ **Standard Constr. Co.**, 600 First National-Soo Line Bldg., Minneapolis, Minn., LB **$2,804,500** (17 bidders), general contract, OFFICE BLDG. for Northwest Airlines Main Base at Wold-Chamberlain Field, MINNEAPOLIS, MINN. Minneapolis-St. Paul Metropolitan Airports Comn., 2429 University Ave., St. Paul 14, Minn. Bids Aug. 25. CD 7/20;

Sterling Elec. Co., 44 South Twelfth St., Minneapolis, Minn., LB **$478,150** (9 bidders), electrical work, Office Bldg., Wold-Chamberlain Field (Minneapolis, Minn.);

R. L. Anderson-Cherne Co., Inc., 5060 Excelsior Blvd., Minneapolis, Minn., LB **$493,902** (10 bidders), mechanical work, Office Bldg., Wold-Chamberlain Field (Minneapolis, Minn.).

▲† **Taylor Wheless Co. Inc.**, Box 1341 Jackson, Miss., CA **$1,728,175**, Auxiliary Dams, Greers Ferry Reservoir, Little Red River, Heber Springs, ARKANSAS. U. S. Eng., P. O. Box 867, Little Rock, Ark. Bids Aug. 18. CD 8/24, under LB.

▲ **IOWA**—State Hy. Comn., Ames, Bids opened 8/25.

Iowa—**Cameron, Joyce & Co.**, 19 S. 7 St., Keokuk, Iowa, LB **$1,646,542**, c. conc. pavement 3.962 mi., I-IG-80-4(4)142, Polk Co.; LB $649,908, c. conc. pavement 1.656 mi., I-80-5 (7) 146, Polk Co.

Iowa—**Jackson Constr. Co., Inc.**, Hy. No. 30 West, Nevada, Iowa, LB **$190,468**, c. conc. pavement wid'n. 1.81 mi., U-96(16), Linn Co.

Iowa—**Norris Constr. Co.**, 311 South Wapello St., Ottumwa, Iowa, LB **$702,096**, b. conc. pavement 8.564 mi., F-FG-788(6), Lee Co. CD 8/12.

▲† **Robert E. McKee, General Contractor, Inc.**, 221 Washington Ave., Santa Fe, N. M., CA **$3,385,136**, 2 story, bsmnt., 54,000 sq. ft. academy chapel, COLORADO SPRINGS, COLO. Dpt. Air Force, 3333 N. El Paso St., Colorado Springs, Colo., Bids July 21, awarded Aug. 28. CD 7/24, under LB.

BUILDINGS—LB & CA

▲ **Refinery Engineering Co.**, 108 N. Trenton St., Tulsa, Okla., CA design and construct SULPHURIC ACID ALKYLATION UNIT, at Refinery, MINNEAPOLIS, MINN. Great Northern Oil Co., Pine Bend, Minneapolis, Minn.

▲ **Robert Paulus Constr. Co.**, 3441 Morganford Rd., St Louis 16, Mo., LB **$4,236,000**, est. over $4,000,000, Base Bid (6 bidders), 3 story, bsmnt., brick, concrete, masonry, steel CLINIC and ADMINISTRATION BLDG., St. Louis State Hospital, 5400 Arsenal St., ST. LOUIS, MO. St. Louis State Hospital, 5400 Arsenal St., St. Louis 9, Mo. and State of Missouri Planning & Constr. Office, 100 State Capitol, Jefferson City, Mo. Bids Aug. 25. CD 7/28.

- ▲ **Sam Patti Constr. Co.**, 1340 Admiral St., Kansas City, Mo., LB **$1,558,000** (14 bidders), POST OFFICE and COURT HOUSE, FORT DODGE, IOWA. General Services Admin., 2306 E. Bannister Rd., Kansas City, Mo. Bids Aug. 25. Griffith Co., P.O. Box 90, South Kenyon Rd., Fort Dodge, Iowa, archt. CD 7/28.
- ▲ **Robert H. Smith Constr. Co.**, 1915 Kolfah St., Houston, Tex., CA **$1,082,800**, HIGH SCHOOL, ANGLETON, TEX. Angleton Ind. School Dist., Angleton, Tex. Bids Aug. 13. CD 8/20, under LB.
- ▲ **Robert H. Smith Inc.**, 1915 Kolfahl St., Houston, Tex. CA **$4,522,057**, general constr. HOSPITAL, BEAUMONT, TEX. Sisters of Charity of Incarnate Word, c/o St. Elizabeths Hospital, N.W. Calder Ave and 11th St., Beaumont, Tex. Bids Aug. 20. CD 8/25, under LB.

  C. Wallace Plbg. Co., 5312 Glenmont St., Houston, Tex. CA **$1,323,000**, plumbing, refrigeration, air-conditioning (Beaumont, Tex.).

  Honote Electric Co., 1498 College St., Beaumont, Tex. CA **$445,943**, electrical work for hospital (Beaumont, Tex.).

Braselton Constr. Co., Box 4027, Corpus Christi, Tex., CA **$932,239**, est. $900,000, 3 story, 160 unit luxury MOTOR HOTEL incl. swimming pool, CORPUS CHRISTI, TEX. American Motor Hotel Corp., c/o A. Art Williams, Jr., archt., 541 W. Water St., Corpus Christi, Tex. Bids Aug. 11. CD 8/20, under LB.

- ▲ **Henry C. Beck Co.**, 1st National Bank Bldg., Dallas, Tex., LB **$1,250,000**, 15 story, 175,000 sq. ft. steel frame, masonry OFFICE, ALLAS, TEX. Praetorian Mutual Life Insurance Co., Main and Stone Sts., Dallas, Tex. Grayson Gill, 1913 San Jacinto St., Dallas, Tex., archt. CD 10/16/58.
- ▲ **Holly Development Co.**, c/o R. Buck Hausman & Assocs., Builders, 4708 Griggs Rd., Houston, Tex. Owner builds. **$450,000.** 18 dwellings **$444,000** 37 dwellings **$420,000** 21 dwellings EAGLE PASS, TEX. Grand total **$1,314,000.** CD 8/13.
- ▲ **Schaeffer Lumber Co.**, Constr. Div., Travis Bldg., San Antonio, Tex. Owner Builds. **$442,750.** 41 dwellings, **$426,500** 39 dwellings, **$411,000** 36 dwellings Kingsborough Ridge Subdivision, SAN ANTONIO, TEX. Grand total $1,280,250. CD 8/13.
- ▲ **Eitze-Kitchens Constr. Co.**, Box 3358, Austin, Tex. CA $1,164,500. WARD, TERRELL, TEX. Bd. for Texas State Hospitals and Special Schools, 4405 N. Lamar Blvd., Box S, Capitol Station, Austin, Tex. Bids Aug. 14. CD 8/21, under LB.
- ▲ **Lippert Brothers**, Box 8305, Denver, Colo. CA **$2,397,237** two Junior high SCHOOLS, PUEBLO, COLO. School Dist. No. 60, 102 West Orman Ave., Pueblo, Colo. Bids Aug. 25. CD 7/24.

FAR WEST

HEAVY CONSTRUCTION—BA

Calif., Patton—GROUNDS IMPRVS.—BA 9/16—State Div. Architecture, 1100 S. Grand Ave., Los Angeles, grounds imprvs. ward bldgs. Patton State Hospital, W.O. 4007GC-50. $75,000-$80,000. CD 4/24/56 under Public Buildings.

Calif., San Diego—PARKING FACILITIES—BA 9/16—State Div. Architecture, 1100 S. Grand Ave., Los Angeles, 665 cars parking facilities, 4 locations, San Diego State College, W.O. 4005GC-36.1. $155,000.

† **Nev., Hawthorne**—MECHANICAL SERVICES—BA 9/16—Dist. P. Wks. Office, 12th Naval Dist., Room C112, San Bruno, Calif., rehabilitation mechanical services, various bldgs. Naval Ammunition Depot, NBy 25203, Spec. 25203/59. $25,000-$100,000.

† **Wash., Tacoma**—AIR BASE IMPRVS.—BA 9/17—U. S. Eng., 1519 S. Alaskan Way, Seattle, Zone 4, replacing 45,000 sq. yd. cement concrete pavement with 1 in. concrete slab, McChord Air Force Base, ENG-45-108-60-26. CD 9/9/58.

† **California**—COMFORT STATIONS—BA 9/24—National Park Service, Dpt. Interior, Sequoia and Kings Canyon National Parks, Three Rivers, comfort stations Sequoia and Kings Canyon National Parks, Proj. SK-W 234. CD 6/12/56.

CALIFORNIA—BA 9/29—Dpt. P. Wks., San Francisco Bay Toll Crossings, 151 Fremont St., San Francisco, **Alameda Co.**—removing railroad tracks, East Bay Mole of San Francisco-Oakland Bay Bridge, reconstr. steel utility poles, electrical and mechanical facilities, alterations and addns. in connection with bay bridge reconstr. proj. $350,000.

- ▲ **California**—BA 10/14—State Dpt. Pub. Wks., 1120 N. St., Sacramento, highway railroad bridge over West Branch Feather River, final link in relocation to clear way for Feather River Proj. Oroville Dam and Reservoir, Highway portion 56 ft. wide, 2,731 ft. long, railroad portion 1,875 ft. long, Butte Co., 11 mi. north of Oroville. Est. $10,000,000. CD 3/27/57.

BUILDINGS—BA

- ▲ **Calif., Oceanside**—HOSPITAL—BA 9/17—Tri-City Hospital Dist., 580 Elm Ave., Carlsbad, 3 story, rein.-con. hospital. $1,500,000. CD 3/25.

† **Wash., Toppenish**—JAIL—BA 9/21—Bureau Indian Affairs, P. O. Box 4097, Portland, Ore., masonry jail, Yakima Indian reservation.

- ▲ **Calif., Los Angeles**—PLANT AND LAUNDRY—BA 10/14—Bd. Suprvs., Los Angeles Co., 501 Hall of Records, central heating and refrigeration plant and laundry, Harbor General Hospital, Torrance. $2,246,952. CD 1/23/57.

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HEAVY CONSTRUCTION—LB & CA

J. C. Hern & Studnek Constr. Co., 113 L St., Anchorage, Alaska, LB **$139,647**, est. $164,000 (7 bidders), exten. storm sewers, Mountain View area, ANCHORAGE, ALASKA. City, City Hall, Anchorage, Alaska. CD 10/13/54.

† **U. S. Eng.**, P. O. Box 7002, Anchorage, Alaska, rejected bids Aug. 18, addns. to water and sewer facilities, Clear Air Force Station, Inv. 60-3, CLEAR, ALASKA. CD 8/16.

† **Yuba Consolidated Industries**, f.o.b. Flagstaff, Ariz., Benicia, Calif., CA **$509,655**, 6 outlet gates, conduit liners, anchor bolts piezometer piping for left diversion tunnel outlet works at Glen Canyon Dam, Spec. DS 5216, ARIZONA. Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo. Bids Aug. 13, awarded Aug. 27. CD 9/1, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento.

Madonna Constr. Co., P.O. Box 910, San Luis Obispo, Calif., CA **$4,739,175**, grading, paving 5.1 mi. 4 lane freeway U.S. Hy. 40 111-Pla-37-D, Placer Co. Bids Aug. 19. CD 8/21, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento,

Guy F. Atkinson Co., 10 W. Orange Ave., South San Francisco, Calif., CA **$2,240,794**, grading, paving to constr. 4.4 mi. 4 lane freeway, U. S. 101 between 0.6 mi. south of Gueneville Rd. and Lytton, north of Healdsburg incl. interchange facilities, 5 bridges and frontage road, IV-Son-1-B, HIBG.A. Sanoma Co. Bids Aug. 12. CD 8/14, under LB.

▲ **Isabell Constr. Co.**, P. O. Box 2351, Airport and South Virginia Rds., Reno, Nev., LB **$1,809,109** (8 bidders), 51,000 acre foot Frenchman Dam, Little Last Chance Creek, Plumas Co., unit Feather River Proj. CALIFORNA. State Dpt. Water Resources, 1120 N. St., Sacramento, Calif. Bids Aug. 26. CD 7/29.

G. P. Van Noy Co., 6611 Blewett St., Van Nuys, Calif. CA **$517,905**, South Taft Creek Bridge, G P Ave. BAKERSFIELD, CALIF. Kern County, Courthouse, Bakersfield, Calif. Bids Aug. 11, awarded Aug. 18.

▲ **Clyde W. Wood & Sons Inc.**, 6900 Tujunga Ave., North Hollywood, Calif., CA **$2,410,000.** Proj. 1, earthwork, channel for Ventura Marina VENTURA, CALIF. Ventura Port Dist., 684 E. Main St., Ventura, Calif. Bids July 28, awarded Aug. 21. CD 8/5, under LB.

Macco Corp. & R. A. Bianchi, 14409 S. Paramount Blvd., Paramount, Calif., CA **$1,143,650.** Proj. 2, rock jetty (Ventura, Calif.).

Baugh Constr. Co., 922 Poplar St., Seattle, Wash., CA **$959,779**, berthing facilities Ventura Marina, VENTURA, CALIF. Ventura Port Dist., 684 E. Main St., Ventura, Calif. Bids Aug. 4, awarded Aug. 21. CD 8/11, under LB.

BUILDINGS—LB & CA

Alder-Child Constr. Co., 250 E. 3900 S., Murray, Utah, LB **$508,600** (9 bidders), ELEMENTARY SCHOOL Parowan CEDAR CITY, UTAH. Iron Co. Bd. Educ., Cedar City, Utah. Gardner & Rasmussen, 173 S. 2nd St., Cedar City, Utah., archts. Bids Aug. 21. CD 6/1.

Wick Constr. Co., 720 N. 35 St., Seattle 3, Wash., CA **$805,500**, general contract 1 story, 80,000 sq. ft., frame Lakota Junior HIGH SCHOOL, AUBURN, WASH. Federal Way School Dist. 210, Auburn, Wash. Bids Aug. 13. CD 8/19, under LB.

Lease Co., Inc., 1501 N. 35 St., Seattle 3, Wash., LB **$621,000** (7 bidders), general contract 1 story, 55,000 sq. ft., masonry Seahurst Junior HIGH SCHOOL, SEATTLE, WASH. School Dist. 401, 253 S. 152 St., Seattle, Wash. Bids Aug. 25. CD 8/7.

▲ **J. D. Burns**, 3917 S.W. 107 St., Seattle, Wash., CA Est. **$1,000,000**, 7 story, rein.-con. APARTMENT, swimming pool, 600 9 Ave., SEATTLE, WASH. Western Apartments, Inc., c/o G. Bolotin & Assocs., archt., 915 E. Pine St., Seattle, Wash. CD 9/1.

▲ **Robert L. Wilson Co.**, 850-29th St., Oakland, Calif., CA **$1,063,250**, 13,000 sq. ft. steel frame, CYCLOTRON BLDG. No. 88, incl. Shops, Labs, Offices. BERKELEY, CALIF. Bd. Regents, University of California, 2 Barrow Lane, Berkeley, Calif. Bids Aug. 4. CD 8/10, under LB.

▲ **Robert E. McKee General Contractor, Inc.**, 4700 San Fernando Rd. West, Los Angeles 39, Calif., CA **$2,093,000**, general constr. Phase I, permanent facilities, Chino YOUTH TRAINING SCHOOL, California Youth Auth., incl. greenhouse, auto and machine shop, shops bldg., chapel, automotive storage bldg., receiving warehouse, commissary addn., auditorium, housing unit, employees apartment bldg. with carports, W.O. 3514GC CHINO, CALIF. State Div. Architecture, 1100 S. Grand Ave., Los Angeles, Calif. Bids Aug. 19. CD 8/24, under LB.

▲ **George A. Fuller Co.**, 3100 W. 8th St., Los Angeles, Calif., CA **$8,500,000,** 19 story BANK and OFFICE, SANTA ANA, CALIF. Union Bank, 760 S. Hill St., Los Angeles, Calif. Thornton, Ladd & Assoc., 160 W. Holly St., Pasadena, Calif., archts.

▲ **L. E. Dixon Co.**, 409 S. California St., San Gabriel, Calif., CA Est. **$3,500,000**, 200,000 sq. ft. MANUFACTURING PLANT, 10,000 sq. ft. administration-engineering bldg., TORRANCE, CALIF. R. C. Mahon Co., 65658 Mile between Mound Rd. and Van Dyke, Detroit, Mich. CD 6/8, under Commercial Buildings.

▲ **Jones-Hettelsater Constr. Co.**, 1911 Baltimore St., Kansas City, Mo., CA Est. **$1,900,000**, FEED MILL, TURLOCK, CALIF. Poultry Producers of Central California, 2700 Merced St., San Leandro, Calif.

CANADA

HEAVY CONSTRUCTION—BA

▲ **Ont., London**—BA 9/21—City, City Hall, storm relief sewers, contracts A and B, $1,500,000. Plans deposit $25. James F. MacLaren Assocs., 321 Bloor St. E. Toronto, engrs. CD 8/1/56.

BUILDINGS—BA

▲ **Alta., Edmonton**—GARAGE—BA 9/21—City, City Hall, 1 story, 131,000 sq. ft. Transit System Garage, $1,500,000. Plans deposit $100; plumbing, heating, ventilation for Edmonton Transit System garage. Plans deposit $25; electrical work for Edmonton Transit System Garage. Plans deposit $25. City Architect, City Hall, archt. DC 4/2.

HEAVY CONSTRUCTION—LB & CA

▲ **BRITISH COLUMBIA**—B. C. Govt., Parliament Bldgs., Victoria,

Perini Pacific Ltd., 475 Howe St., Vancouver, B. C. CA **$7,295,584**, fdns. and substructure for Port Mann Bridge, two main supporting piers, two anchor piers, 28 approach bents which support girders, Port Mann. Bids June 26. CD 7/16, under LB.

▲ **BRITISH COLUMBIA**—British Columbia Govt., Parliament Bldgs., Victoria. Bids opened 8/14,

Dawson, Wade & Co., 775 Clark St., Vancouver, B. C. and Emil Anderson Co., Ltd., Hope, B. C., LB **$1,566,239**, constr. 10.94 mi. Cassiar-Stewart Hy., Atlin Dist. CD 7/30.

BUILDINGS—LB & CA

▲ **Canadian Bechtel Ltd.**, 25 King St. W., Toronto, Ont. CA Est. **$4,000,000**, design and construct OIL REFINERY, offices, plant laboratory, administration, warehouses, Main Highway, Calgary and Edmonton RED DEER, ALTA. Canadian Oil Companies Ltd., 188 University Ave., Toronto, Ont.

Foundation of Canada Ltd., 1220 Bay St., Toronto, Ont. CA Est. **$500,000**, fibre glass FACTORY, EDMONTON, ALTA. Fibreglass Canada Ltd., 10719 46th St., Edmonton Alta. Foundation of Canada Engineering Corp. Ltd., 8 Spadina Rd., Toronto, Ont., engr.

C. H. Whitham Ltd., 11810 124th St., Edmonton, Alta. CA Est. **$442,960**, 1 176 x 246 ft. story, steel frame, masonry WAREHOUSE, 12410 142nd St., EDMONTON, ALTA McLeod's Ltd., 10332 101st St., Edmonton, Alta. **(Correction**—contractor). CD 8/11CA.

Acme Constr. Co. Ltd., Rothesay Ave., Saint John, N. B. LB **$671,736**, SCHOOL, Sandy Point Rd. SAINT JOHN, N. B. School Bd., 1 Hazen St., Saint John, N. B. Bids July 26. CD 6/25.

Desourdy Freres Ltee, 54 St. Jacques St., St. Johns Que. CA Est. **$175,000**, 1 story, bsmnt, rein.-con. structural steel, PLANT EXTENSION, ST. JOHNS, QUE. Dominion Blank Book Co. Ltd., 230 Foch St., St. Johns, Que. Awarded Aug. 20.

PROPOSED PROJECTS

WATER SUPPLY

Mo., Festus—City, City Hall, voted $704,000 bonds Aug 11, WW and sewerage sys. extens., imprvs., incl. sewage disposal plant and sewer lines. **$1,215,000.** Haskins, Riddle & Sharp, 1009 Baltimore Ave., Kansas City, Mo., consult. engrs.

N. J., Morristown—Town, Town Hall, water transmission main, Hanover Twp. **$160,000.** Wm. Dickerson, 110 South St., engr.

SEWERS, WASTE DISPOSAL

▲ **Ark., Van Buren**—City, City Hall, sewers (P-Ark.-3016) **$1,500,000,** John E. Mahaffey, Box 122 Fayetteville, consult. engr.

Ky., Middlesboro—City, City Hall, sewerage sys. extens., imprvs., Proj. No. Ky. P-3024. **$258,000.**

Ky., Williamstown—City, sanitary sewerage sys. **$690,000.** Howard K. Bell, 553 S. Limestone St., Lexington, engr.

N. J., Somerville—Twp. of Bridgewater, Twp. Hall, Somerville, installing sewer mains in Sunnyside Terrace, Bridgewater Twp. **$135,000.** Lee T. Purcell, 148 Alder Ave., Wayne, consult. engr.

O., Vandalia—Village, Bd. P. Affairs, Village Hall, sanitary sewers extension, proposed residential development area, **$731,734.** Burgess & Niple, 2015 W. Fifth, Columbus, consult. engrs.

Alta., Red Deer—City, City Hall, sewage treatment plant. **$655,000.** Haddin, Davis & Brown Ltd., 1134 8th Ave. W., Calgary, consult. engrs.

EARTHWORK, WATERWAYS

† **Georgia**—Pine Mountain Soil Conservation Dist., Talbottom, watershed protection, Palmetto Creek, 13,450 acres for Soil Conservation Service. **$234,845.**

STREETS AND ROADS

▲ **ALABAMA**—State Hy. Dpt., Montgomery. **Baldwin Co.**—20 in. interstate hy. incl. 3 overpasses, joining Ala. 59 four mi. N. of U. S. 90-Ala. 59 intersection near Loxley—then E. to Florida Line at Perdindo River, **$9,000,000.**

▲ **Tex., Fort Worth**—City, City Hall, Berry-Tarrant Rd. Exten. from Mitchell to Miller. **$1,240,000.** Reaves & Gregory, 3332 W. 7th St., consult. engrs. CD 3/25/54.

AIRPORTS

▲ **Ariz., Phoenix**—TERMINAL—City, City Hall, plans by Weaver & Drover, 128 E. Camelback Rd., and Lescher & Mahoney, T & T Bldg., terminal bldg. at Sky Harbor Airport, **$3,000,000.** Johannessen & Girand, 3500 N. Central, consult. engrs. CD 5/28/57.

Mass., East Boston—FOOD PREPARATION KITCHEN—United Air Line, Logan Airport, plans by Symmes, Maini & Hryniewicz, archts.-engrs., 604 Putnam Ave., Cambridge, food preparation kitchen, Logan Airport. **$200,000.** Constr. 1959.

▲ **Alta., Calgary**—AIRPORT—City, City Hall, runway, municipal airport, **$1,000,000.** CD 12/15/54.

PUERTO RICO

Puerto Rico, Fajardo—HOTEL, etc.—El Conquistador Hotel Corp., c/o Robert Alderdice, archt., 1155 Ashford Ave., San Juan, 80 room hotel with funicular (cable car). **$850,000.** Hotel Corp. of America, lessee. Curtis & Davis, 338 Baronne St., New Orleans, La., U. S. A., consult. archts.

▲ **Puerto Rico, San Juan**—HOMES—J. J. Otero, 1556 Ponce de Leon Ave., San Juan, plans by Angel Aviles, 22 Yardley Pl., 150 homes, Laguna Gardens. **$2,700,000.**

▲ **Puerto Rico, San Juan**—SHOPPING CENTER—Town House Development Corp., (J. J. Otero) Box 3307, plans by Angel Aviles, 22 Yardley Pl., 250,000 sq. ft., 22 acre Las Casas Shopping Center. **$2,650,000.** Puerto Rico Testing Service, Inc., 475 J. A. Canals' St., consult. engrs.

FOREIGN

▲ **Australia, Melbourne**—Melbourne Metropolitan Bd. of Works, 110 Spencer St., Ring Rd. around City incl. bridge spanning railroad yards and Yarrow River **$11,300,000,** overpass, **$3,400,000** and 2,080 ft. freeway bridge. Bids 1961.

▲ **Ind., Terre Haute**—PHYSICAL EDUCATIONAL—Indiana State Teachers College, Admin. Bldg., plans by Miller-Vrydagh & Miller, 201 Opera House Bldg., physical education, **$2,500,000.** Homer Howe, and Ralph Stuart, 204 Opera House Bldg., engrs. CD 10/2.

▲ **N. S., Burnside**—INSTITUTE—Dpt. P. Wks. Hunter Bldg., Ottawa, Ont., Oceanographic Institute, shore of Bedford Basin, incl. docks, two permanent headquarters, **$3,000,000.**

PUBLIC BUILDINGS

▲ **Calif., Coronado**—SCHOOL—Coronado Unified School Dist., 911 7th St., Junior-Senior High School. **$1,202,500.** Constr. 1961.

▲ **Ga., Decatur**—SCHOOLS—DeKalb County Bd. Educ., bond election Oct. 6, schools. **$11,500,000.** CD 11/5/56.

Me., Buxton—SCHOOL—School Administrative Dist. No. 6, Towns Limington-Buxton-Hollis and Standish, plans by Allied Engineering, Inc., archt.-engr., 649 Forest Ave., Portland, Me., Area High School, Rtes. 35 and 22. **$600,000.**

▲ **Wis., Fox Lake**—CORRECTIONAL INSTITUTION—State Dpt. P. Welfare, Madison, plans by Curtis & Davis, 2475 Canal St., New Orleans, La., Correctional Institution (prison), near here. **$5,000,000.** Bids in Fall. Roger C. Kirckhoff, c/o owner, archt.

Man., Swan Lake—COLLEGIATE—Swan Lake Bd. Educ., plans by MacLeod & Reimer, 300 Main St., Winnipeg, collegiate. **$400,000.**

Ont., Toronto—MUNICIPAL—Scarborough Twp., 2001 Eglinton Ave. E., plans by Carter, Coleman & Rankin, 2201 Kingston Rd., municipal bldg. addn., Eglinton Ave. E. **$450,000.**

COMMERCIAL BUILDINGS

▲ **Ariz., Window Rock**—LODGE—The Navajo Tribal Council, plans by John Carl Warnecke & Assocs., 111 New Montgomery St., San Francisco, Calif., Window Rock Lodge 14 acres, N. of Rte. 3, **$1,303,000.**

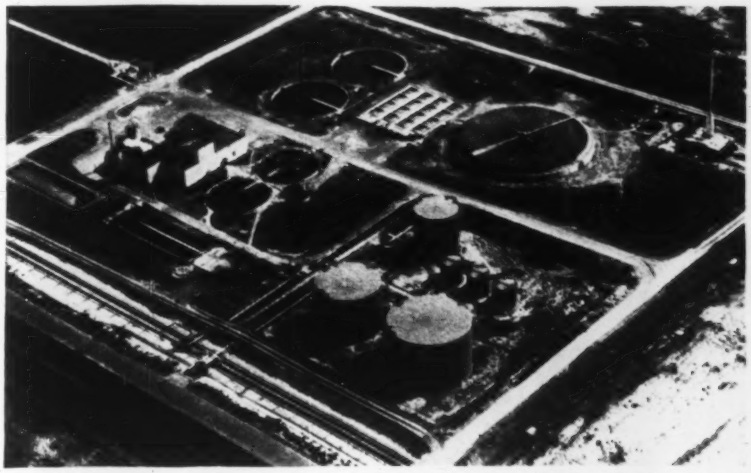
▲ **Calif., Rheem**—BOWLING ALLEY—Rheem Center Bowling Corp., c/o Wayne A. Littlejohn, archt., 43 Moraga Hy., Orinda, 24-lane bowling alley. **$1,000,000.**

Calif., Yuba City—BOWLING ALLEY—Owner, c/o Walter E. Ekhardt Real Estate, 425 F St., Marysville, 24-lane bowling alley, Colusa Hy. **$650,000.**

Conn., Greenwich—SCHOOL—Convent of the Sacred Heart, Collender's Point, Noroton, plans by Lyons & Mather, 211 State St., Bridgeport, school. **$405,000.**

Conn., Hartford—MOTEL—John E. Hayes, 170 Sibourney St., motel, restaurant, Brainard Rd. **$400,000.**

Ky., Danville—MOTEL-RESTAURANT, etc.—Owner, c/o James B. Stagg, archt., 11 Harding St., Danville, Ky. motel-restaurant and swimming pool. **$400,000.**



Consulting Engineers: Bechtel Corporation, San Francisco, Calif.

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Unique treatment plant meets strict requirements . . . using Dorr-Oliver equipment

In establishing its refinery near Anacortes, Wash., the Shell Oil Company faced strict requirements for control of pollution in an important commercial fishing and recreational area.

Requirements are met by efficient waste treatment facilities that handle all process and drainage waters from the refinery, as well as sanitary wastes. Operations include oil-water separation, chemical flocculation, biological treatment including trickling filtration, activated sludge and complete sludge handling. Virtual elimination of objectionable phenols is accomplished by utilizing a strain of bacteria specially adapted to phenol consumption. The excellent results achieved are shown in an analysis of the plant effluent, which averages only 7 ppm of oil and 0.15 ppm phenols, both well below the required State minimums.

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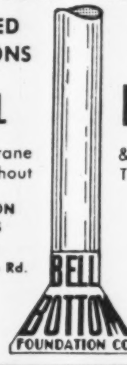

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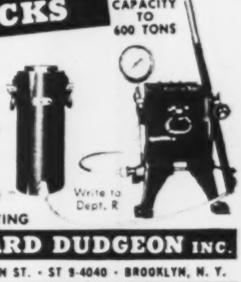

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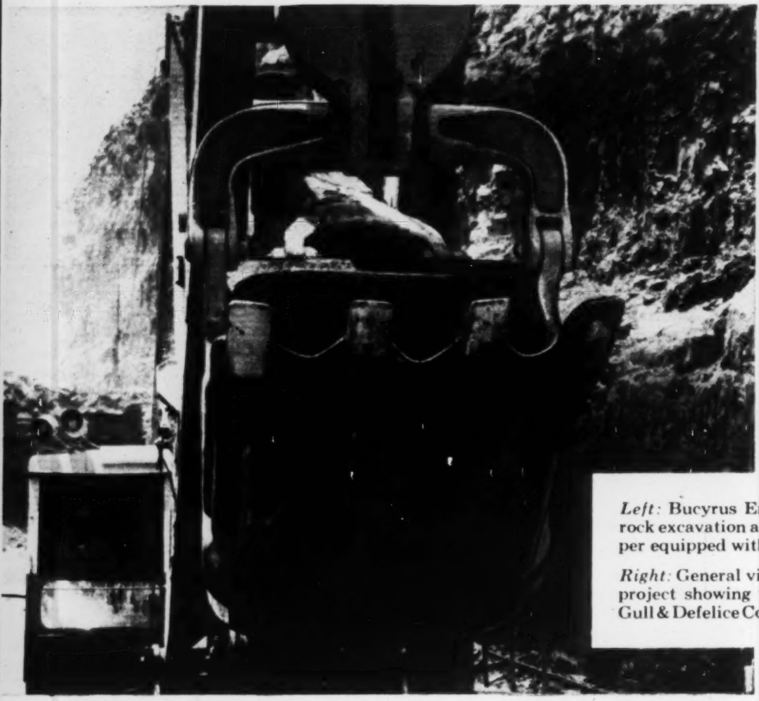
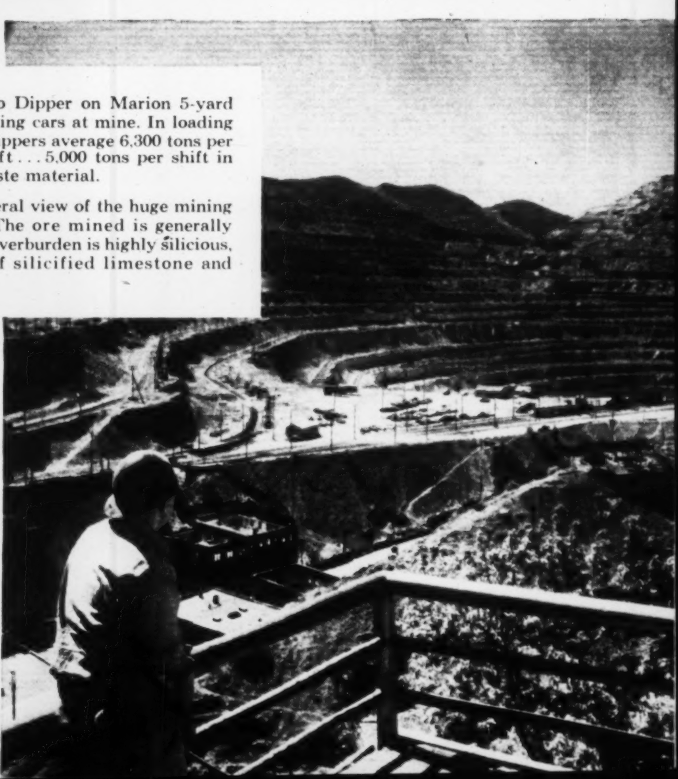


Left: Bucyrus Erie 88B shovel used for rock excavation at Conduit #2 South. Dipper equipped with Amsco Simplex Teeth.

Right: General view of Conduit #2 South project showing rocky terrain in which Gull & Defelice Construction Co. operates.

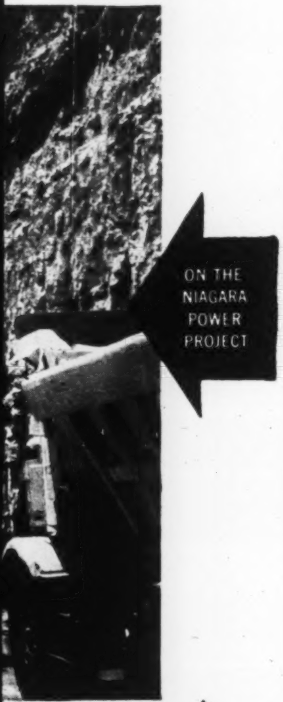


Left: Amsco Dipper on Marion 5-yard shovel, loading cars at mine. In loading ore, these dippers average 6,300 tons per 8-hour shift . . . 5,000 tons per shift in working waste material.

Right: General view of the huge mining operation. The ore mined is generally porphyry. Overburden is highly silicious, composed of silicified limestone and quartzite.

MORE TONS PER DOLLAR

Read these user reports on how AMSCO Dippers and Teeth perform in rugged digging service



ON THE NIAGARA POWER PROJECT

40,000 YARDS OF ROCK HANDLED BEFORE AMSCO 2-PART TEETH NEED REPLACING

Gull & Defelice Construction Co. is working on Section 3 of the powerhouse conduit project – excavating 140 feet deep, almost entirely in rock. All five power shovel dippers on the job are now equipped with Amsco Simplex 2-Part Reversible Teeth.

These dippers work *16 hours a day, 6 days a week for 2 weeks–handle approximately 40,000 yards of rock*–before tooth replacement is required.

Says Mike Cazzolla, Equipment Superintendent, in talking about the Amsco teeth: "They're built rugged and take a lot of punishment from the rock. We get longer wear out of them because we can turn them over." He's referring, of course, to the reversible tip feature.

John Cazzolla, Master Mechanic, adds the important fact that *they can replace these teeth in ten minutes with no trouble.* This feature, together with the longer wear, means important savings in downtime.

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This huge copper mine operates the largest collection of big power shovels (5 yards and up) in the world. For this rugged service they use Amsco dippers to strip off extremely abrasive overburden ... handle waste material ... and load copper ore. These are cast manganese steel dippers – built for toughness, high abrasion resistance and long service life.

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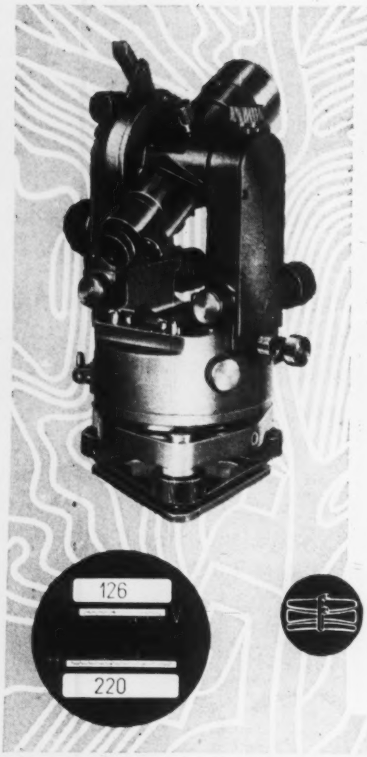

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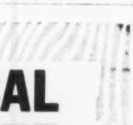

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▲ **Mo., St. Louis County**—SHOPPING CENTER—Bonhomme Development Co., 7811 Carondelet Ave., Clayton, Zone 5, plans by M. C. A. Constr. & Eng. Corp., 9216 Clayton Rd., Richmond Heights, Zone 17, 1 story, 100,000 sq. ft. Bridge City Mart shopping center, incl. 700 car parking, Lindbergh Blvd. and Telegraph Rd. **$1,500,000.** Bids soon.

▲ **N. J., Bayville**—SHOPPING CENTER—Equity Brokerage Corp., 60 Park Place, Newark, and Ernest Lichtman, Perth Amboy, 200,000 sq. ft. shopping center, Garden State Parkway and Rte. 9, Berkeley Twp. **$1,000,000.**

▲ **N. Y., New York**—SHOPPING CENTER, etc.—Allstate Outlet Stores Corp., c/o Brett, Wyckoff, Potter, Hamilton, Inc., 15 East 47th St., New York Zone 17, N. Y., Bronx East Shopping Center and cooperative apartments, Bruckner Expressway and White Plains Rd. **$15,000,000.**

▲ **O., Cincinnati**—HOME—St. Joseph Orphanage, Blue Rock and Cherry St., plans by Bentz & Bankemper & Assocs., 319 Scott, Covington, Ky., children's home, North Bend Rd. and Edalbert Dr., **$1,000,000.** Hixson, Tarter & Assocs., 2306 Park, Cincinnati, consult. engrs.

O., Cincinnati—APARTMENT—Spinnenweber Builders, Inc., 7505 Montgomery Rd., 5 story, 20-unit, brick apartment, east side Bond Pl. **$480,000.**

▲ **Tex., Fort Worth**—RESIDENCES—Cassco Land Co. Inc., 3240 Preston Hollow, plans by Preston M. Geren, Jr., 1607 Fort Worth National Bldg., 310 brick veneer residences, Edwards Ranch Addn. **$3,850,000.**

▲ **Tex., Fort Worth**—RESIDENTIAL DEVELOPMENT—Hill & Moore Constr. Co., P. O. Box 174, 1st unit residential development, incl. 125 brick veneer, concrete residences in Western Trails Addn. **$1,500,000.** Hawkins & Bartlett, P. O. Box 174, consult. engrs.

▲ **Tex., Houston**—BANK-OFFICE—American Bank & Trust Co., 1968 W. Gray St., plans by Wirtz, Calhoun, Tungate & Jackson, 2506 Richton St., bank-office, W. Gray Ave. **$1,000,000.**

▲ **Tex., Houston**—DWELLINGS—D. H. Canterbury & John B. Brown, Developers-Builders, 1201 Almeda-Genoa Rd., 35 dwellings **$429,150,** 37 dwellings **$422,000,** 30 dwellings **$404,500,** 33 dwellings **$417,225,** 40 dwellings **$411,500,** "Canterbury Village".

Tex., Houston—SHOPPING CENTER—Fontaine Place Shopping Center, 10000 Blk. Homestead Rd., masonry shopping center expansion. **$415,000.**

▲ **Tex., Houston**—DWELLINGS—Dan McCrary & B. H. Howton, Builders, 11201 S. Post Oak Rd., plans by L. B. Wootters, 2706 Richmond Ave., 25 dwellings **$435,100,** 20 dwellings **$406,150,** 23 dwellings **$425,000,** Anderson Estates subdivision extension.

Tex., Houston—BANK—Meyerland State Bank, 3270 Sul Ross St., plans by McCleary & McCormick, 3270 Sul Ross St., bank, Beechnut and Endicott Sts. **$400,000.**

▲ **W. Va., Fairmont**—ALUMINUM ROLLING MILL ADDN.—Fairmont Aluminum Co., P. O. Box 912, (sub. Cerro de Pasco Corp., 300 Park Ave., New York, N. Y.), aluminum rolling mill addn., **$10,000,000.** A. J. Boynton & Co., 111 N. Wabash St., Chicago, Ill., consult. engrs. CD 8/14.

INDUSTRIAL BUILDINGS

Tex., Houston—PLANT—Robertson Manufacturing Corp., 2830 Holmes Rd., plant, 3½ acres, Ricks Rd. **$110,000.**

UNCLASSIFIED

† **Alaska, Kodiak**—ELECTRICAL AND TELEPHONE SYS.—Officer in Charge Constr., Bureau Yards & Docks, Navy 127, Box 38, Postmaster, Seattle, Wash., plans by R. W. Beck & Assocs., archts.-engrs., 1500 Tower Bldg., Seattle, Wash., replacement and/or imprv. to electrical and telephone sys., U. S. Naval Station, NBy 2483. CD 9/24/51.

Conn., New Britain — AUDITORIUM — City, City Hall, auditorium as war memorial, Willow Brook Park. **$500,000.**

Fla., Dunedin—MARINA—City, City Hall, marina. **$250,000-$300,000.** Gee & Jensen, 502 Main St., consult. engrs.

Ky., Ludlow—SWIMMING POOL—Ludlow Veterans Club, 830 Elm St., swimming pool, recreation area. **$100,000.**

▲ **Minnesota-Wisconsin**—GAS PIPE LINES—Northern States Power Co., 15 South Fifth St., Minneapolis, Minn., laying gas pipe lines St. Cloud, Sartell, Sauk Rapids, Waite Park, Winona and Goodview, Minn; LaCrosse, French Island, Onalaska and Shelby, Wis. **$2,740,000.**

▲ **Texas**—GAS LINES—Texas Illinois Natural Gas Pipeline Co., 20 N. Wacker Dr., Chicago, Ill. and 1114 Texas Ave. Bldg., Houston, Tex., 45 mi. lateral gas lines, Aransas, Brazoria, Calhoun and Galveston Counties, near Aransas Pass, **$585,000;** 6,700 hp. compressor station, near Victoria, **$1,800,000.**

Tex., Panhandle—RESERVOIR—Cities Service Oil Co., 3329 SW Blvd., Tulsa, Okla., reshaping portions reservoir for gas injection, Panhandle Field. **$175,000.**

Wash., Seattle—SWIMMING POOLS—Shoreline Recreation Dist., E. 158 St. and 20 Ave. N.E., **$375,000** bond election Nov. 10, 2 indoor swimming pools.

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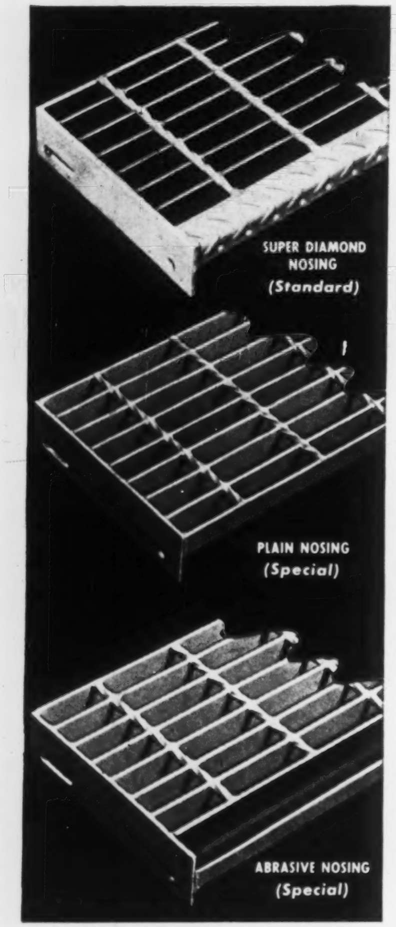

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NEW ENGLAND

BUILDINGS—BA

▲ **N. H., Hanover**—HOPKINS CENTER—BA 10/14—Trustees Dartmouth College, Hanover, 400x200 ft. area, structural 4 bldg. group, incl. galleries, studios and workshops, concert hall, lecture auditorium, theater, alumni hall and snack bar for Hopkins Center. Total est. **$7,000,000.** Harrison & Abramovitz, 630 5th Ave., New York, N. Y., archts. Paul Weidlinger, 400 Madison Ave., New York, N. Y., structural engr. CD 5/16/57.

HEAVY CONSTRUCTION—LB & CA

▲ **CONNECTICUT**—State Hy. Comr., 170 Douglas St., Hartford, Bids opened 8/31,

Oneglia & Gervasini, Inc., Casson Ave., Torrington, Conn., LB **$6,637,491** (5 bidders) grading, draining and reinf. concrete pavement 3,619 lin. ft. incld. 5 bridges relocation Rte. US 6 and grading, drainage and reinf. conc. pavement 855 lin. ft. incl. 3 bridges relocation Rte. U. S. 7, Fed. Aid Projects 1-34-1 (4) 3 and F30-8 Projects 34-103 and 34-105 Danbury. CD 8/26.

BUILDINGS—LB & CA

▲ **F. I. Merrill**, 187 Sawyer St., South Portland, Me., LB **$1,220,404**, DISTRIBUTION CENTER, Rumery Industrial Park, SOUTH PORTLAND, ME. Dartmouth Real Estate Co., 290 Baxter Blvd., Portland, Me. Bids Aug. 26. CD 8/12.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

New York—BA 10/6—Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York, Zone 19, electrical work at Lewiston Power Plant, Lewiston, Niagara Co., Spec. No. PA-N-25031, Niagara Contr. No. N22. Plans $20 per initial set, $10 per set for addnl. sets, not refundable. Uhl, Hall & Rich, 23 Congress St., Boston 10, Mass., engrs. CD 8/15/57.

BUILDINGS—BA

▲ **Md., Bethesda**—HOSPITAL—BA 9/15—The Suburban Hospital Assoc., Inc., 8600 Old Georgetown Rd., (selected list bidders), masonry, steel, concrete, block hospital addn., alteration. $1,750,000. Faulkner, Kingsbury & Stenhouse, 1200 18th St. N. W., Wash., D. C., archts. CD 1/30.

▲ **N. Y., Tarrytown**—INN—BA 9/15—Hilton Corp., 401 Seventh Ave., New York, Zone 1, 200 room Hilton Inn, Broadway and Thruway, Exit No. 9. $2,000,000. William B. Tabler, 401 Seventh Ave., New York, N. Y., archt. CD 2/10.

▲ **N. Y., Wyandanch**—SCHOOL—BA 9/21—Union Free School Dist. No. 9, junior-senior high school, Garden City Ave. $1,800,000. Office of Louis E. Jallade, 597 Fifth Ave., New York 17, N. Y., archt. CD 4/21.

▲ **N. Y., Oceanside**—SCHOOL—BA 10/21—Bd. Educ., junior high school. $3,300,000. Knappe & Johnson, 2110 Northern Blvd., Manhasset, N. Y., archts. CD 3/13.

HEAVY CONSTRUCTION—LB & CA

▲ **Marinelli Constr. Corp.**, 149-44 22nd Ave., Whitestone, N. Y., CA **$1,400,387**, sanitary sewer, 157th Ave. from 84th to 87th Sts., etc. Queens Boro, NEW YORK. President Queens Boro, Queens Boro Hall, 120-55 Queens Blvd., Kew Gardens 24, N. Y. Bids July 29. CD 8/4, under LB.

BUILDINGS—LB & CA

▲ **Walsh Constr. Co.**, 713 3rd Ave., New York, N. Y., CA Est. $5,700,000, general contract, ENGINEERING CENTER, 500 W. 120th St., NEW YORK, N. Y. Columbia University, 116 St. and Broadway, New York, N. Y. Voorhees, Walker, Smith & Smith, 101 Park Ave., New York 17, N. Y., archts. CD 11/19/58.

▲ **Cauldwell-Wingate Co.**, 101 Park Ave., New York 17, N. Y., CA Est. **$2,000,000**, 13 story APARTMENT, Wilkinson Ave. between Mulford and Appleton Aves., Bronx Boro, NEW YORK, N. Y. Hutchinson Parkway Apts. Inc., 350 Fifth Ave., New York 1, N. Y. Joseph & Vladeck, 1841 Broadway, New York 23, N. Y., archts. CD 1/8, under Mario J. Cusati as owner.

▲ **Kolyer Constr. Co.**, 111 E. 38th St., New York, N. Y., CA **$3,000,000**, CO-OPERATIVE HOUSING known as Inwood Heights, 1701 Nicholas Ave. near 193rd St., NEW YORK, N. Y. Inwood Heights Apartments, c/o Kokkins & Lyras, 111 E. 38th St., New York, N. Y. Brown & Guenther, 1860 Broadway, New York, N. Y., archts. CD 10/25/57.

▲ **George Rabinor & Jack Match**, c/o Tito DiVincenzo, archts. 135 E. 65th St., New York 21, and Sylvester W. A. Murphy, 280 W. 246th St., New York, N. Y., Owner Builds, **$2,000,000**, 18 story APARTMENT, east side Bailey Ave. south of Van Cortlandt Park South, NEW YORK, N. Y. CD 5/1.

▲ **Pineview Homes, Inc.**, 609 Woodland Ave., Linden N. J., Owner Builds, **$1,000,000**, 50 HOUSES, Locust Ave., ROSELLE, N. J.

SOUTH

HEAVY CONSTRUCTION—BA

BUILDINGS—BA

Ga., Hamilton—HOUSING—BA 9/15—Harris Co. Housing Auth., 40 housing units, $400,000. Plans deposit $50. Tomberlin & Sheetz, 1429 Peachtree N.E., Atlanta, archts.

N. C., High Point—Y.W.C.A.—BA 10/7—Young Women's Christian Assn., 1108 N. Main St., Y.W.C.A., $425,000. Plans deposit $50. Robert Guarino and Leon Schute, 332 S. Wrenn St., archts. CD 7/13.

HEAVY CONSTRUCTION—LB & CA

▲† **Carter Constr. Co.**, 106 W. Olney Rd., Norfolk, Va. LB **$1,220,000**, est. $1,125,000. 554 units Wherry Housing reconstr. and repairs, water and sewer sys. repairs, Naval Air Station, OCEANA, VA. Dist. P. Wks. Office, 5th Naval Dist., Room 307, Bldg. N-26, U.S. Naval Base, Norfolk, Va. B. B. Spigel, Kresge Bldg., Norfolk, Va., archt. C. Warren Bogan, Franklin Bldg., Norfolk, Va., engr. CD 6/5, under LB.

BUILDINGS—LB & CA

▲ **McDonough Constr. Co. of Georgia, Inc.**, P. O. Box 1738, Atlanta, Ga., CA est. **$2,500,000** MAIL ORDER PLANT ADDN., GREENSBORO, N. C. Sears, Roebuck & Co., 675 Ponce de Leon Ave. NE, Atlanta, Ga.

▲ **Gilbane Constr. Co.**, 90 Calvary St., Providence, R. I., CA **$1,000,000**, 2 story, 278 x 297 CB-S Tampa MOTOR LODGE, Dale Mabry Highway and Jetton Ave., TAMPA, FLA. Charles S. Michel & Assocs., c/o Wielage & Eaton, archts., 1303-C S. Dale Mabry Highway, Tampa., Zone 9, Fla.

▲ **Ray M. Wright, Inc.**, 1037 2 Ave., Columbus, Ga., day labor, **$1,000,000** 100 RESIDENCES, Wellington, Estates Subdivision, COLUMBUS, GA.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

Ill., Chicago—BA 9/18—Bd. Local Improvements, City Hall, Zone 2, bit., and c. conc. paving streets and alleys, various locations, $297,500. Hugh W. Short, City Hall, Zone 2, ch. engr. CD 4/30.

Wis., Benton—BA 9/22—Village, Village Hall, sewage treatment plant, lift stations and sanitary sewers. Plans deposit $15. Davy Engr. Co., Inc., 524 Main St., La Crosse, archt. CD 4/16/58.

HEAVY CONSTRUCTION—LB & CA

▲ **James McHugh Constr. Co.**, 6449 S. Park Ave., Chicago, Ill., LB **$1,320,985**, est. $1,000,000 (3 bidders) Div. W, sewerage, pump and blower house and sludge disposal bldg. addn., Calumet Sewage Treatment Plant, CHICAGO, ILL. Metropolitan Sanitary Dist., 100 E. Erie St., Chicago 11, Ill. Burton Scheidt, 100 E. Erie St., Chicago, Ill., ch. engr. Bids Aug. 27.

▲ **Michael J. McDermott & Co.**, 30 N. LaSalle St., Chicago, Ill., CA **$1,986,810**, 4 SUBWAY STATIONS, Congress Expressway, Central Ave., Oak Park Ave., Austin Ave., Harlem Ave., CHICAGO, ILL. Chicago Transit Auth., Merchandise Mart, Chicago 54, Ill. H. S. Anthon, Merchandise Mart, Chicago 54, Ill., engr. Awarded Aug. 26. CD 1/14.

Kil-Bar Electric Co., 2261 N. Clybourn Ave., Chicago Ill., CA **$688,895**, installing electric power and communications sys. for transit lines, Congress Expressway, Central to DesPlaines Ave. (Chicago, Ill.).

▲ **Arcole Midwest Corp.**, 3225 Main St., Skokie, Ill. CA **$1,856,817**, No. 0102.5, grade separation, Northwest Expressway, E. River Rd. to Soo Line, Airport lead, CHICAGO, ILL. Bd. Comrs. Cook Co., County Bldg., Chicago 2, Ill. Bids Aug. 18. Awarded Aug 28. CD 8/31, under LB.

▲ **WISCONSIN**—State Hy. Comn., State Office Bldg., Madison,

Wis.—**Hoffman Constr. Co.**, Black River Falls, Wis., CA **$1,041,055**, grade, subbase and structures B-11-42 to 48, 6.485 mi. Lake Delton-Madison Rd. (Wisconsin River-S.T.H. 60), IH 90, Contr. 1, Proj. I-90-2(8) 111, Columbia Co. Bids July 28.

Wis.—**Bushman Constr. Co.**, 3706 Broadway, Kansas City, Mo., CA **$674,330**, concrete pavement 6.489 mi. Dubuque-S.T.H. 35 and Dubuque-Dickeyville Rds. and Main St., Village of Dickeyville, U. S. H's 61 and 151, Contr. 1, Projs. F 012-1(37), F 012-1(38) and T 012-1(19), Grant Co. Grand total $1,715,385. CD 8/3, under LB.

BUILDINGS—LB & CA

▲ **E. I. DuPont de Nemours & Co.**, duPont Bldg., Wilmington 98, Dela. Owner builds, LABORATORY and OFFICE at Mylar Plant, CIRCLEVILLE, O.

▲ **Seltzer Building Co.**, 4080 Park Fulton W., Cleveland 9, O., CA est. **$1,250,000**, Longwood SHOPPING CENTER, E. 40 and Scovill Ave., CLEVELAND, O. George N. Seltzer, 4080 Park Fulton W., Cleveland 9, O. Heine, Crider & Williamson, 105 Front St., Berea, O., archts.

MISSISSIPPI TO ROCKIES

BUILDINGS—BA

▲ **Minn., St. Paul**—Y.W.C.A.—BA 9/19—Y.W.C.A., 125 East Fifth St., 8 story Y.W.C.A., incl. swimming pool, East Kellogg Blvd., and Minnesota St. $1,000,000. G. Dimond & Assocs., Inc., 416 Endicott-on-Fourth Bldg., St. Paul, Minn., archt. CD 9/2/58.

HEAVY CONSTRUCTION—LB & CA

▲ **O. R. Burden Constr. Co.**, 6702 E. 21st St., Tulsa, Okla., CA est. **$2,385,000**. 49 mi. 18 in. 55 mi. 20 in. gas lines between Kelsey Base (Brooks) to fields, LaSalle Co., near Cotulla, TEXAS. Coastal States Gas Producing Co., c/o Oil Industries Bldg., Corpus Christi, Tex.

BUILDINGS—LB & CA

▲ **Bob Eldridge Constr. Co.**, 3206 Strong, Kansas City, Kan., LB **$715,395**, (4 bidders), 63,215 sq. ft. EAST JUNIOR HIGH SCHOOL, 64th Terrace and Sears Dr.; LB **$667,370**, (3 bidders), 55,791 sq. ft. WEST JUNIOR HIGH SCHOOL, 82nd & Wood Ave.; LB **$1,358,078**, (8 bidders), combination EAST and WEST JUNIOR HIGH SCHOOLS, KANSAS CITY, KAN. Washington Rural High School Dist. No. 2, 8008 State, Kansas City, Kan. Horner & Horner, 1401 Fairfax Trafficway, Kansas City, Kan., archts. Bids Aug. 13.

▲ **Smith & Williams**, 7901 Ambassador Row, Dallas, Tex. CA Est. **$1,784,165**. SHOPPING CENTER, area and parking center pavement site earthwork Ferndale Rd. and N. E. Hy. DALLAS, TEX. Northlake Development Corp., c/o David Bruton Jr., Pres., 1st National Bank Bldg., Dallas, Tex. CD 5/6.

▲ **Stalder & Son**, 800 Washington, Denver, Colo., CA **$1,500,000**, 16 story, bsmnt., parking, 20 x 40 ft. swimming pool, The Lido Luxury APARTMENT, 780 Washington St., DENVER, COLO. Van Schaack & Co., 624 17 St., Denver, Colo. Robert H. Hiester, Railway Exchange Bldg., Denver, Colo., archt.

FAR WEST

HEAVY CONSTRUCTION—BA

▲ **Wash., Tacoma**—BA about 10/1—City, City Hall, complete Mayfield Dam, Cowlitz River, $30,000,000. CD 11/9/54.

† **Oregon**—BA 10/20—U. S. Eng., 628 Pittock Block, Portland, Zone 5, design, mfg., deliver, install, test two 15,789 kva generators of vertical shaft, hydraulic turbine driven type, Hills Creek Reservoir, abt. 50 mi. east of Eugene, CIVENG-35-026-60-43. CD 9/23.

▲† **Oregon and Washingtno**—Bids About 11/19—U. S. Eng., City-County Airport, Walla Walla, Wash., North Shore constr., incl. 2,500,000 cy common excavation, 1,300,000 cy rock excavation, 1,000,000 barrels cement, John Day Lock and Dam. Plans deposit $200. CD 9/19.

HEAVY CONSTRUCTION—LB & CA

▲ **John A. Artukovich Sons Inc.**, 16200 South Atlantic Ave., Paramount, Calif., LB **$1,239,085** (10 bidders), New Hope Placentia Trunk Sewer, Contr. No. 2-3, SANTA ANA, CALIF. Orange County Sanitation Dist. No. 2, Courthouse, Santa Ana, Calif. Bids Aug. 26. CD 8/15/58.

BUILDINGS—LB & CA

▲ **Carl N. Swenson Co. Inc.**, 1095 Stockton Ave., San Jose, Calif. CA **$2,902,257**, 7 story with bsmnt., 135,000 sq. ft. rein.-con. COUNTY OFFICE, SAN JOSE, CALIF. Santa Clara County Bd. Supervs., 1st and Rosa Sts., San Jose, Calif. Bids July 23. CD 7/30, under LB.

▲ **Bechtel Corp.**, 485 Lexington Ave., New York, N. Y. CA **$1,684,110**. design and construct, concrete HEATER STRUCTURES, platforms, feed prep. unit, reactor, etc. SAN PEDRO, CALIF. Texaco Co., Inc., 135 E. 42nd St., New York, N. Y.

▲ **Leon Slavin**, 470 S. San Vicente Blvd., Los Angeles, Calif. CA **$1,116,894**. Antelope Valley COLLEGE, increment No. 2. LANCASTER, CALIF. Antelope Valley Joint High School Dist., 100 W. Lancaster Blvd., Lancaster, Calif. Bids Aug. 6, awarded Aug. 18. CD 8/12, under LB.

▲ **Sumerod Bldg. Co.**, 8900 W. Olympic Blvd., Beverly Hills, Calif. Owner builds **$1,349,920**, 126 frame DWELLINGS, Park Poway Unit No. 1, POWAY, CALIF.

▲ **Puget Sound Bridge & Drydock Co.**, 2929 16th Ave. S. W., Seattle, Wash., CA ELECTRONICS PLANT Palisades and MacArthur Blvd., NEWPORT BEACH, CALIF. Lockheed Aircraft Corp., 2555 N. Hollywood Way, Burbank, Calif.

▲ **Diversified Builders Inc.**, 6855 E. Rosecrans, Paramount, Calif., CA est. over **$1,000,000**, 62,000 sq. ft. ENGINEERING and RESEARCH BLDG., SAN DIEGO, CALIF. Solar Aircraft Co., 2200 Pacific Hy., San Diego, Calif. Frank L. Hope & Assoc., archts. and George Vernon Russell, consult., 1447 6th St., San Diego, Calif., archt.

▲ **Pacific Constr. Co.**, 2826 Kaihikapua St., Honolulu, Hawaii. CA **$1,432,400.** 156 units each Punchbowl HOMES, HONOLULU, HAWAII. Hawaii Housing Auth., 1002 N. School St., Honolulu, Hawaii. Bids Aug. 20. CD 8/26, under LB.

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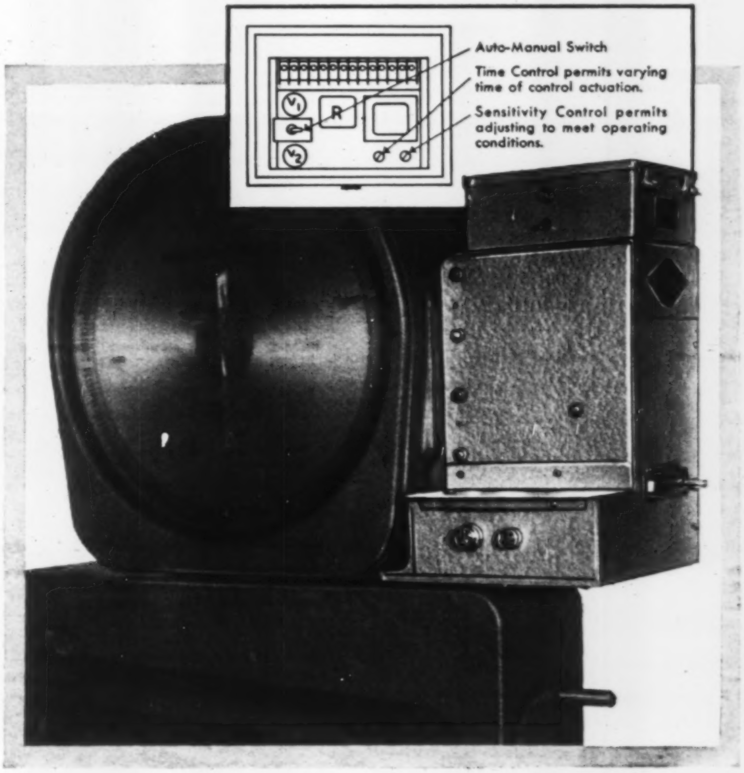
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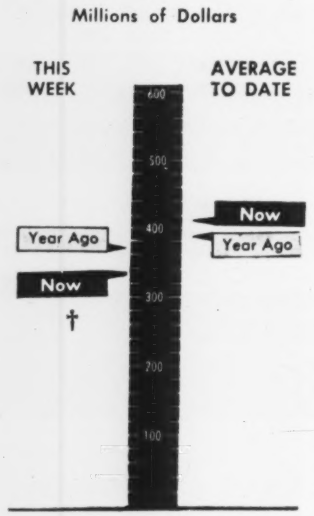
Construction Scoreboard

CONTRACTS ...



AMOUNT OF CONTRACTS LET

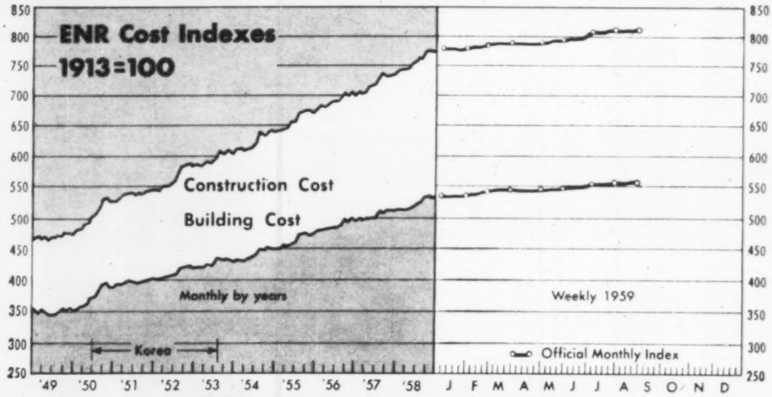
	†This Week	Cum. 37 wks 1959	Chge '58-'59
	millions		%
All Heavy Constr.	$338.8	$15,154.0	+ 5
By Ownership			
PRIVATE	228.8	7,534.9	+28
PUBLIC	110.0	7,619.1	−10
State & Municipal	99.3	5,512.5	−10
Federal	10.7	2,106.6	−10
By Type of Work			
PUBLIC			
Waterworks	3.2	301.4	+32
Sewerage	11.0	477.3	+ 6
Bridges*	5.5	560.9	+ 9
Highways	49.9	2,243.6	−11
Earthwork, Dams & Waterways	4.5	664.2	−16
Buildings:			
Excl. Housing	21.2	1,891.4	− 2
Housing	2.7	476.0	−49
Unclassified	12.1	1,011.8	− 9
PRIVATE			
Buildings:			
Mass Housing	125.3	3,390.1	+19
Commercial	37.3	1,638.7	+18
Industrial	55.1	2,124.9	+60
Unclassified	11.0	373.7	+14

*Includes private bridges † 4 day week

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

CAPITAL . . .

New Capital For Construction	Week of Sept. 3	Cum. 36 wks 1959	Chge '58-'59
	millions		%
Corporate Securities	$ 10.8	$2,615.9	−31
State and Municipal:			
All Except Housing	44.8	4,340.7	− 4
Housing	....	75.2	+122
Federal Loans	4.1	99.1	−28
Federal Aid	249.2	3,107.2	+1,337
Total Nonfederal	$308.2	$10,238.1	+18
Federal Appropriations:			
Projects in U. S.	$802.8	$1,226.3	−71
Outside U. S.	....	4.4	−81
Total New Capital	$1,111.6	$11,468.7	−12



CURRENT COST INDEXES

ENR INDEXES (1913=100), 20-cities' average	Week of Sept. 3 1959	% Change from Aug. 6 1959	Sept. 4 1958
Construction Cost	812.56*	+0.14	+49.2
Building Cost	555.88*	+0.17	+3.71

* Official Monthly Index for September, 1959.

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

WAGE RATES, 20-cities' average

	Sept. 1959	% Change from Aug. 1959	Sept. 1958
Common	$2.624	+0.2	+6.1
Skilled (average 3 trades)	3.921	+0.4	+4.8
Bricklayers	4.166	+0.3	+4.3
Structural Ironworkers	3.955	+0.9	+5.4
Carpenters	3.649	+0.1	+4.9
Equipment operators (average three types)	3.526	+2.2	+4.0

MATERIAL PRICES, 20-cities' average

Structural Steel (average 3 mills), per cwt	5.50	0	0
Lumber, 2x4 Fir, per M fbm	126.50	+0.6	+7.7
Lumber, 2x4 Pine, per M fbm	110.83	+0.1	+7.5
Cement, bulk, per bbl	3.965	0	+0.4
Sand, per ton	2.475	0	−2.4
Ready-mixed concrete, per cu yd	14.06	0	+2.0
Gypsum sheathing, ½"x2'x8', per Msf*	63.263	+0.4	+0.6
Fiber board sheathing, ½" sq. ed., per Msf*	72.678	+0.2	+1.8
Mineral wool insulation, 3' batts, per Msf*	68.38	−0.2	−3.2
Crushed stone, 1½", per ton, CL	2.694	0	−5.4
Concrete blocks, sand/gravel, 8"x8"x16", each*	.228	−1.7	0
	Aug. 1959	July 1959	Aug. 1958
Brick, common per M	39.213	0	+4.6
Lime, hydrated finishing, per ton, CL	39.027	0	+5.7
Structural clay tile, 3x12x12", per M, 2,000 up*	184.69	0	+0.5
Vitrified clay sewer pipe, std 12", per ft	1.365	+0.9	+7.1
Concrete sewer pipe, 12", per ft	1.303	0	+1.0

* Delivered, trucklots

ENR INDEX REVIEW

	Construction Cost		Building Cost		Volume	
	1913=100	1949=100	1913=100	1949=100	1913=100	1949=100
Sept	773.47	162.15	535.02	152.09	541	156
Oct	775.30	162.53	536.53	152.51	446	129
Nov	774.12	162.28	534.96	152.07	384	111
Dec	773.81	162.22	534.79	152.02	466	135
1958 Average	759.16	159.15	521.68	149.15	531	153
1959						
Jan	778.28	163.15	536.23	152.43	460	133
Feb	778.75	163.25	537.25	152.72	472	136
Mar	781.35	163.80	540.32	153.59	586	169
Apr	784.41	164.44	542.93	154.33	532	154
May	790.37	165.69	544.44	154.76	700	202
Jun	795.16	166.69	548.35	155.87	650	188
July	806.69	169.11	551.74	156.84	671	194
Aug	811.15	170.04	554.31	157.60	509	147
Sept	812.56	170.33	555.88	158.01	...	...

U.S. Contractors Buck a Trend

- **Five firms have offered to finance and construct $95 million worth of Argentine public works.**
- **It's a bold move in face of the trend away from U. S. investment in Latin America.**

Two combines of U. S. contractors are offering to finance and construct about $95 million worth of public works in Argentina.

Companies, areas, projects and amounts involved are:

- Bedell and Nelson Engineers, Inc., and Williams-McWilliams Industries, both of New Orleans; work in Santa Fe Province; jobs include 450 miles of provincial roads, two prisons, a central market building, a government office building, two airports. Estimated cost, $25 million.
- Moore Lopier Corp., New York City, Williams-McWilliams Construction Co., an affiliate of the New Orleans company, and Taylor International of Miami; work in Entre Rios Province; jobs include hotels, housing, 620 miles of streets and roads, sewers and an airport. Estimated cost, $50 million.

The Moore Lopier group would also be given a federal government contract for construction of an 8,800-ft vehicular tunnel under the Parana River between the cities of Santa Fe and Parana, capital cities respectively of Santa Fe and Entre Rios provinces. The tunnel project includes 2,200 ft of approach roads. Estimated cost is $20 million.

The tunnel contract and another for 1,800 miles of federal roads is contingent on signing a final contract with Entre Rios Province for its proposed public works projects.

Source of the $95 million has not been disclosed by the construction companies involved, but spokesmen say the funds will come from "institutional-type investors in the U.S."

The funds would be forthcoming in the face of increasing reluctance on the part of U. S. financial and industrial interests to invest in Latin America because of political and economic unrest. This trend is illustrated by a McGraw-Hill Department of Economics survey. Companies accounting for about 75% of all overseas investment annually by U. S. manufacturing and petroleum industries reported their outlays in Latin America this year and next will be 34% below 1958 (ENR Aug. 13, p. 21).

Underlining the hazards of investment in Latin American countries is a recent order by the Cuban government that cut power rates there by 30.5%. The company affected is owned by American and Foreign Power Co., Inc., New York City. Because the rate reduction could possibly have an adverse effect on earnings of the parent corporation, American and Foreign Power immediately cancelled the sale of $15 million worth of convertible debentures, which had been oversubscribed by investors. The buying commitments, however, had been made prior to the rate-cut order. American and Foreign Power is also negotiating for an indemnity of at least $62 million for its power facilities expropriated by Brazil.

It is against this background that the construction combines are offering to operate. However, the participants in the ventures are old, established companies with extensive experience in Latin American construction.

McWilliams is a heavy construction and dredging company with an annual volume averaging $10 million. It constructed a pipeline across the Orinoco River for Orinoco Mining Corp., a subsidiary of U. S. Steel Corp.

Taylor International is strictly a building firm. Its average annual gross is $30 million. It built the Del Lago Hotel in Maracaibo, Venezuela, and the El San Juan Hotel in Puerto Rico.

Moore Lopier, a heavy construction company, grosses from $20 million to $25 million a year with subsidiaries.

Top men in the organizations say they are confident they will be paid for work done under any contracts that may eventually be signed, despite the unrest in parts of Latin America.

However, two executives of the companies involved did tell of experiences that could be called "unpleasant."

Maury Mason, chairman of the board of McWilliams, recently abandoned a consulting engineering practice in Cuba, leaving behind furniture, equipment and other possessions.

And Harry Horowitz, president of Moore Lopier, still holds a $10-million contract for construction work in Cuba. Only hitch: It was signed by the now deposed Batista government.

The projects more or less walked into the Moore Lopier Corp. and from there, the combines were born.

Here's how it happened.

A group of Argentine engineers completed preliminary designs for a long-time provincial dream of a tunnel under the Parana River. The Argentine federal government expressed interest, but said it could not finance it.

Later, in the course of traveling, Mr. Horowitz was asked by one of the designers if he could raise money for construction and establish a company to do the work.

With Mr. Horowitz spearheading the plan, Moore Lopier, Taylor and McWilliams joined forces and succeeded in obtaining loan commitments from private sources in the U. S. for the $20 million needed.

The money would be deposited in Argentina for 20 years. And for 30 years, the construction company would collect and keep the tunnel tolls.

After 20 years, the funds on deposit would be returned, based on the difference between the original deposit and the unamortized portion of the credit extended by the government. This amount would be payable over 10 years in equal annual installments.

The Argentine government also agreed that the companies could bring $2 million worth of U. S. construction equipment into the country duty free. If the equipment is removed after completion of the projects, it would not be taxed.

During the preliminary tunnel negotiations, the Public Works Minister of Entre Rios Province visited Mr. Horowitz and asked if he would be willing and able to obtain financing for $50 million of provincial public works.

The money commitment again was obtained. With it came a letter of intent from Entre Rios Province. The Santa Fe Province Project plans developed in much the same manner.

Santa Fe Province will pay in cash, 20% of the value of work completed each month. The balance will be financed by the U. S. companies, which will receive notes quarterly of $750,000 each. Interest will be 5.75% a year. First notes will not be due before January 1, 1963. Late payment will be penalized by an interest rate of 10%.

(B&F continued p. 80)

August Volume Dips, Industrial Rises

Only industrial building moved counter to the general downward trend in heavy construction contract awards during August.

Awards totaled $1.5 billion, 25% below the July weekly average and 8% under one year ago. This marks the fifth consecutive year that August awards went below the preceding month.

So far this year, however, volume of $14.3 billion is 4% above last year. At the end of July, total volume was 6% ahead of the figure for the first seven months of 1958.

The late summer sag hit hardest in the public works category.

Federal projects dropped 34% below July to $177 million. That's the lowest volume since February, but 6% above one year ago.

State and municipal awards of $541 million are down 31%. That's the lowest since February and smallest for an August month on a weekly average basis. Both federal awards this year of $2.1 billion and state and local contracts of $5.3 billion are off 8% from last year.

Despite a 17% decline in private work last month, the $778 million of new work going to contractors made August the fourth month this year that private projects topped public works.

Volume for the month was 8% above one year ago, and was the best August rate since the boom year of 1956. The total of nearly $7 billion in private volume this year tops last year's same period by 22%. It also accounts for almost half of all new awards this year. A year ago, less than 42% of new business came from private sources.

Private mass housing awards have been shrinking for four consecutive months, measured on a weekly average basis. Although this sector is still the biggest single construction market, the $303 million worth of awards in August is 25% below July and 9% below one year ago.

August, however, was only the second month this year that housing dropped behind the comparable month of 1958. But chances are good that housing will continue to decline. An ever-tightening money market will place the mortgage loan sector in an extremely cramped corner. Moreover, the veto by President Eisenhower of Congress' second try at a housing measure could speed a decline in starts.

Another probably won't be cleared this session. This will probably result in a contraction of builders' plans.

So far, industrial building is the big surprise in the construction market. It not only runs counter to the downtrend in all other types of construction, but its gain is healthy. It is 51% ahead of one year ago, and it is quite likely that awards in coming months will continue to outstrip those of last year.

Good earnings and generous depreciation balances will permit industry to sign up for new plants required to meet expanded demands of the next decade. The high cost of money may not even dampen that possibility, considering that half of the interest paid is offset by the 52% corporate income tax rate.

Cost Outlook: Steady for The Rest of This Year

The crest of the annual wave of materials price increases and wage boosts has past. The rising cost of construction is tapering off.

And with lumber prices starting their traditional autumn decline, the outlook is for steadier costs for the rest of this year.

ENR's 20-Cities Construction Cost Index for September is up fractionally to a new high of 813. The 20-Cities Building Cost Index is steady at 556, compared to 554 in August. Both indexes are based on 1913 = 100.

The sharp month-to-month rate of cost increases since January slowed appreciably in August.

Engineering Construction Contracts for August

Four Weeks—Thousands of Dollars (000 Omitted)

	August, 1959								Eight Months—Continental U. S. Cumulative			
	New England	Middle Atlantic	South	Mid-West	Mississippi to Rockies	Far West	Total Continental U. S.	% Change August '58 to '59	1959	1958	% Change '58 to '59	Canada August 1959
Public Works, Total	**47,092**	**103,589**	**160,340**	**131,477**	**155,122**	**119,752**	**717,372**	**−20**	**7,351,768**	**8,016,155**	− 8	75,874
Waterworks	2,256	3,077	3,340	7,144	5,361	5,874	**27,052**	+32	**295,407**	219,665	+34	968
Sewerage	3,111	7,023	12,103	11,434	7,720	10,076	**51,467**	− 9	**455,508**	419,712	+ 8	2,014
Bridges	828	4,747	9,978	17,263	16,790	16,310	**65,916**	+18	**539,554**	472,070	+14	2,075
Earthwork, waterways	364	9,489	19,690	1,253	37,871	10,272	**78,939**	+57	**653,957**	776,724	−16	1,255
Streets and roads	15,932	39,157	39,986	48,311	42,266	18,950	**204,602**	−45	**2,136,790**	2,313,406	− 8	33,953
Buildings: Residential		490	6,022		806		**7,318**	−84	**468,398**	908,051	−48	
Other	21,437	25,682	44,755	22,429	23,675	39,167	**177,145**	− 8	**1,824,309**	1,834,810	− 1	22,323
Unclassified	3,164	13,924	24,466	23,643	20,633	19,103	**104,933**	− 5	**977,845**	1,071,717	− 9	13,286
State & Municipal	45,761	92,659	95,459	115,482	99,089	92,111	**540,561**	−26	**5,273,409**	5,763,032	− 8	63,065
Federal	1,331	10,930	64,881	15,995	56,033	27,641	**176,811**	+ 6	**2,078,359**	2,253,123	− 8	12,809
Private, Total	**48,021**	**167,731**	**115,529**	**209,968**	**176,853**	**59,506**	**777,608**	**+ 8**	**6,973,351**	**5,715,438**	**+22**	**111,856**
Bridges				88			**88**	−82	**7,756**	8,996	−14	
Buildings: Industrial	11,530	25,810	64,730	89,836	41,913	6,636	**240,455**	+51	**1,885,894**	1,288,516	+46	40,253
Mass housing	28,076	84,036	25,905	72,285	64,973	28,124	**303,399**	− 9	**3,149,987**	2,740,518	+15	11,064
Commercial	7,778	57,539	20,202	43,819	30,508	22,139	**181,985**	− 2	**1,571,590**	1,360,300	+16	58,639
Unclassified	637	346	4,692	3,940	39,459	2,607	**51,681**	+21	**358,124**	317,108	+13	1,900
Total Aug., 1959—4 weeks	**95,113**	**271,320**	**275,869**	**341,445**	**331,975**	**179,258**	**1,494,980***	**− 8**				**187,730**
Total July, 1959—5 weeks	137,305	423,960	538,806	421,074	475,726	485,421	**2,482,292***					172,542
Total Aug., 1958—4 weeks	110,995	381,237	234,890	346,043	324,576	223,934	**1,621,675**					165,418
Eight Months—1959	**868,886**	**3,092,104**	**2,549,001**	**2,519,681**	**2,933,596**	**2,361,851**			**14,325,119***		**+ 4**	**1,024,397**
Eight Months—1958	930,756	3,544,396	1,767,247	2,492,745	2,748,309	2,248,140				13,731,593		1,128,036
% Change '58 to '59	−7	−13	+44	+1	+7	+5						−9

* Add Alaska: Aug. '59: 5,212 July '59: 10,711 8 Mos. '59: 75,874

ENGINEERING NEWS-RECORD *reports continental U. S. construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation,* $53,000; *other public works,* $88,000; *industrial buildings,* $110,000; *other buildings,* $400,000.

Hawaiian Building Boom Forecast

The construction market in Hawaii, already strong, will be even stronger in the coming decade.

Construction put in place this year and next is expected to hit an average of $203 million annually. That compares to the record $174.4 million worth of work put in place in 1958. The total may rise to an average of $230 million a year between 1966 and '70.

The projections come from the Stanford Research Institute of Menlo Park, Calif. They are part of an 84-page report on a study of Markets for Materials in Construction in Hawaii made at the request of the Territory of Hawaii Economic Planning and Coordination Authority.

Heavy construction awards in Hawaii during the first eight months of 1959 top $33.5 million, according to ENR records. Mass housing (public) and industrial building account for two-thirds of this total.

The study also shows:

- **The total market for construction materials in Hawaii last year was $100 million.** About $22 million went for lumber, $15 million for iron and steel and fabricated steel products, and $14 million for concrete and concrete products. Between 1966 and 1970, this is expected to rise to $25 million a year for lumber and $18 million each for steel and concrete products.

There will be variations in demand for building materials, because of expected differences in the segments making up the construction market. For example, several items are estimated to have a growth rate greater than the average for all building materials over the next 10 years. They are iron pressure pipe used in water systems; corrugated galvanized steel and aluminum sheets, used in industrial buildings; and plaster, used in hotels, apartment houses and commercial buildings, but rarely in residences.

In contrast, hardwood lumber, redwood, cast iron soil pipe and asphalt tile are expected to lag behind the overall rate of growth. Reason: The next decade's boom will be in nonresidential building rather than housing.

Hawaii imports a great part of its construction materials and will have to continue to do so until its own industrial plant expands. It does produce brick, woven wire fencing and concrete products. And local production of cement and reinforcing bars is planned for the near future. Two cement plants with a combined annual capacity of 2.7 million barrels are now being constructed (ENR Aug. 27, p. 79).

Bid Prices Up in California

Contractors' bid prices on California highway jobs rose sharply in the second quarter. The bid price index jumped 25.1% above the first quarter to 270.4, the Division of Highways reports. The index is based on 1940 = 100.

Two factors caused the rise: a sharp drop in the average size of projects, reflecting a cutback in Interstate highway awards; and much less bidding.

Many of the second quarter awards were for resurfacing projects. This work brings proportionately higher traffic handling costs and less opportunity for economies in plant setups and work scheduling than was possible on the large jobs let in the first quarter.

In the second quarter only 54% of the $41 million in jobs were for $1 million or more each, and only one job was for over $5 million. But in the first quarter 90% of the $67 million in awards was for jobs costing more than $1 million. Contracts exceeding $5 million each accounted for 45%.

Although bidding competition was relatively high in the second quarter, with an average of 6.3 bids per job, the number was less than the 8.2 bids per job in the first quarter. Five bidders per project is considered "competitive."

The bid price index for the first quarter dropped 9.4%. However, the highway division describes that drop as "a false one."

It says, "many bidders had a weather eye out for the predicted slowdown of Interstate contracts . . . largely disregarded indicated cost increases and cut profits to the bone" to secure basic projects to keep their men working.

Average unit prices rose in the second quarter for all bid items included in the California index with the exception of untreated rock base.

Roadway excavation jumped 66 cents per cu yd, up 61% from the first quarter and highest since late 1957. Portland cement concrete for structures went up 32% to a record $65.36 per cu yd. But portland cement concrete pavement edged up only slightly, to $14.03 per sq yd. Increases were also moderate in asphaltic and bituminous mixes, up 7% to $5.77 per ton. Reinforcing steel rose 24% to a record 13.4 cents per lb, while structural steel increased 20% to 19.8 cents per lb.

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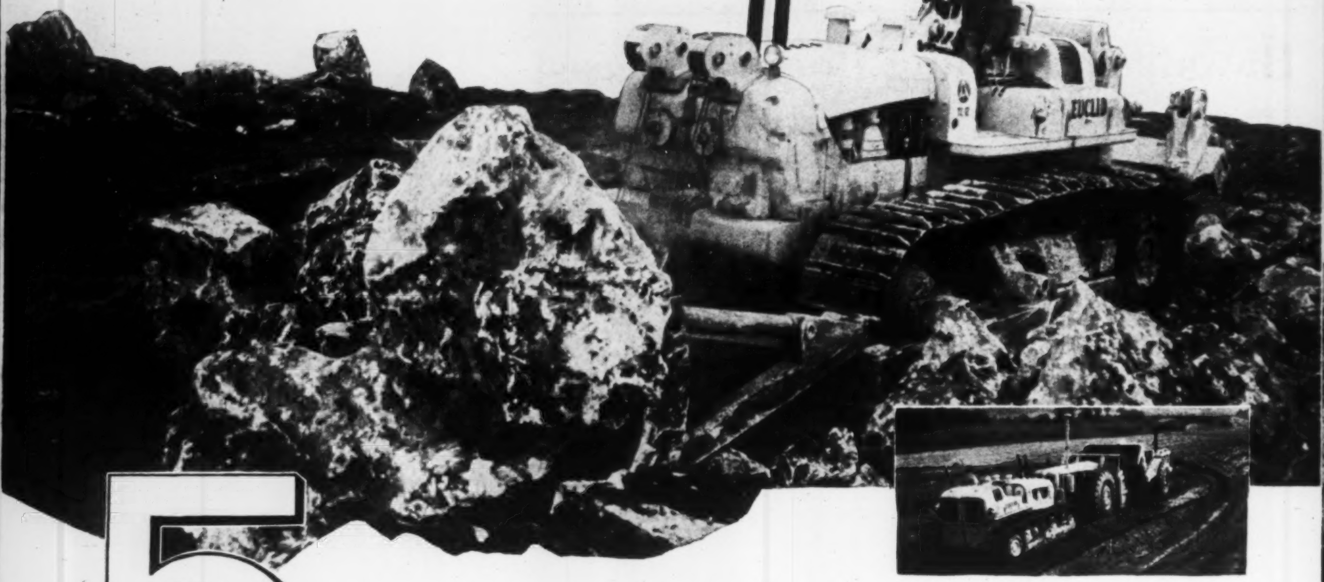

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Labor Bill Changes Industry Law

- **It legalizes pre-hire labor contracts, seven-day union shops, some hiring practices and employer apprenticeship contributions.**
- **It allows restrictions on the subcontracting of site work, but tightens hot-cargo, boycott and picketing provisions.**

The new labor bill will sharply crimp union picketing and secondary boycott tactics. It will also grant some special exemptions for AFL-CIO building trades unions.

The 1959 labor reform bill will, in essence, legalize many hiring and labor contract practices now used in the construtcion industry. But the general restrictions on picketing and boycott pressure will give contractors a stronger hand.

For the construction employer the new bill cuts two ways, and he may well like both. The organized employer, for instance, can continue contracts restricting subcontracting to union labor. And the unorganized employer is given new defenses against unions seeking to sign him up.

The bill is a strict compromise between the House and Senate labor reform measures. While the final version of the law is heavily weighted with the tougher provisions of the bill as it passed the House, the compromises won by the forces of Sen. John F. Kennedy (D., Mass.) in conference salvaged some of the key demands made by the AFL-CIO construction unions.

The final version was enough of a compromise so that both construction unions and employers had some good things to say about it. Sentiment at Associated General Contractors heavily favored the bill. Contractors who already had clauses specifying union labor in their contracts could continue them, but with new restrictions on union power to enforce them. And nonunion contractors were freed of some pressure that craft unions heretofore could use against them.

The AFL-CIO building trades unions were hardly enthusiastic about the general boycott and picketing curbs. But they won amendments to Taft-Hartley they had been trying to get through Congress since that law was passed.

The final version came after 12 days of pulling and pushing by House-Senate conferees, and in some cases the results were hardly clear-cut. Legal experts from the construction industry and unions had varied interpretations of some of the bill's provisions.

Here are the provisions of major interest to construction:

- **Secondary boycotts.** The rule now bars unions from forcing organized employers into aiding them in a dispute by refusing to do business with other employers. And they cannot demand the "hot-cargo" contract, such as exists in the trucking industry, where the employer agrees by contract that his workers will not have to handle the goods of another employer with whom the union is in dispute.
- **The bill makes a construction exception,** however. Unions are permitted to demand typical hot-cargo clauses "relating to the contracting or subcontracting of work to be done at the site." This would, for example, legalize contract bans on the use of nonunion subcontractors.
- **Organizational picketing.** Unions cannot picket an employer to organize his workers where another union already has an existing contract until 12 months after that contract was signed. Where there is an unorganized employer, the union can picket for 30 days or until there is a representation election. Picketing is illegal after that.

The construction unions must comply with these picketing rules. An attempted exemption to permit them to picket a construction project made up of many subcontractors—a secondary boycott violation—failed in conference (see page 85).

- **Pre-hire, seven-day union shop.** This craft union amendment was placed in the reform bill when the common site picketing fell out. This rule, in effect, legalizes the current practice of unions and contractors making agreements before the contractor bids for the construction work. By this method the contractor can estimate his labor costs before making the bid.

In addition, if the union secures a union shop agreement, the workers must join that union after seven days to keep their jobs. The rule for other unions is 30 days, but the new provision recognizes that most construction projects are for the short haul.

This amendment also provides a legal okay for current hiring hall practices in construction. It says that employers can advise unions of job openings, giving them an opportunity to refer applicants. In addition, construction labor contract clauses can specify minimum training and seniority rules for hiring preferences.

As a final construction touch, the reform bill sanctions employer payments to apprentice training funds.

There was give-and-take on other issues. The bill contains a states rights clause, permitting the states to handle "no-man's land" cases in interstate commerce. These are cases rejected by the National Labor Relations Board as too small. State agencies and courts have been barred from intervening.

While unions opposed this amendment on the grounds that state rules are often tougher than the Taft-Hartley Act, they did get one long-sought amendment—the right of strikers to vote in representation elections.

Once the compromise was reached on the Taft-Hartley issues, it was a mere formality for the bill to become law. The strict reform measures, which make up a large part of the bill, had been agreed to early in conference.

As far as the reform rules are concerned, unions and employers are required to make public their financial dealings with one another and with middlemen involved in union activities. Particularly, the employer must disclose in reports to the Secretary of Labor any funds paid to union members or others affecting the right of his employees to organize and bargain.

There are some exceptions from the reporting, such as details on an employer's relationship with his attorney. But where the employer is required to report, failure to do so makes him subject to one year in jail and a $1,000 fine.

The union officer also faces these criminal penalties in dealing with union members.

(Labor continued p. 84)

States Match U.S. Wage-Hour Laws

What the State Laws Include

State	Payment Bond for Wages	Payment		Premium Pay	Maximum Hours	Minimum Wages	Wages on Pub. Works
		Form	Frequency				
Ala.	No	No	No	Yes	No	No	No
Alaska	No	Yes	Yes	Yes	Yes	$1.50	Yes
Ariz.	No	Yes	Yes	Yes	Yes	No	Yes
Ark.	Yes	Yes	Yes	Yes	Yes	No	Yes
Calif.	Yes	Yes	Yes	Yes	Yes	No	Yes
Col.	Yes	Yes	Yes	Yes	Yes	$1.00	Yes
Conn.	Yes	No	Yes	Yes	Yes	No	Yes
Del.	Yes	No	Yes	No	No	No	Yes
D.C.	Yes	Yes	Yes	No	Yes	No	Yes
Fla.	Yes	Yes	No	Yes	No	No	Yes
Ga.	No	Yes	Yes	Yes	Yes	No	No
Hawaii	No	No	Yes	Yes	Yes	$1.00	Yes
Idaho	Yes	Yes	No	No	Yes	$.75	Yes
Ill.	Yes	Yes	Yes	Yes	Yes	No	Yes
Ind.	Yes	Yes	Yes	Yes	No	No	Yes
Iowa	Yes	No	No	Yes	No	No	No
Kan.	Yes	Yes	Yes	Yes	Yes	No	Yes
Ky.	No	Yes	Yes	Yes	Yes	No	Yes
La.	Yes	Yes	Yes	No	No	No	No
Maine	Yes	No	Yes	Yes	No	No	Yes
Md.	No	No	No	Yes	Yes	No	Yes
Mass.	Yes	Yes	Yes	Yes	Yes	$.90	Yes
Mich.	Yes	Yes	Yes	Yes	Yes	No	Yes
Minn.	Yes	Yes	Yes	Yes	Yes	No	Yes
Miss.	No	No	No	Yes	No	No	No
Mo.	No	No	Yes	Yes	Yes	No	Yes
Mont.	Yes	Yes	Yes	No	Yes	No	Yes
Neb.	Yes	No	No	No	No	No	Yes
Nev.	No	Yes	Yes	Yes	Yes	No	Yes
N. H.	Yes	Yes	Yes	Yes	No	$.85	Yes
N. J.	No	Yes	Yes	Yes	Yes	No	Yes
N. M.	No	Yes	Yes	Yes	Yes	$.75	Yes
N. Y.	Yes	Yes	Yes	Yes	Yes	No	Yes
N. C.	No	No	No	Yes	Yes	$.75	No
N. D.	Yes	No	No	Yes	No	No	No
Ohio	Yes	Yes	Yes	Yes	Yes	No	Yes
Okla.	Yes	Yes	Yes	Yes	Yes	No	Yes
Ore.	Yes	Yes	Yes	No	Yes	No	Yes
Pa.	Yes	No	Yes	Yes	Yes	No	Yes
P. R.	....	....	....	....	....	....	....
R. I.	Yes	Yes	Yes	Yes	Yes	$1.00	Yes
S. C.	No	Yes	Yes	Yes	Yes	No	No
S. D.	No	No	No	No	Yes	No	No
Tenn.	Yes	Yes	Yes	Yes	No	No	Yes
Tex.	Yes	Yes	Yes	Yes	Yes	No	Yes
Utah	No	Yes	Yes	Yes	Yes	No	Yes
Vt.	No	No	No	Yes	No	$1.00	Yes
Va.	Yes	No	No	Yes	No	No	No
Wash.	Yes	Yes	No	No	Yes	$1.00	Yes
W. Va.	Yes	Yes	Yes	Yes	Yes	No	Yes
Wis.	Yes	Yes	Yes	Yes	Yes	No	Yes
Wyo.	No	No	No	No	Yes	$.75	No

(This is the second in a series of articles on state labor laws.)

One who sets up his own construction company or who obtains construction work outside his home state is confronted by a maze of local laws that control his employment practices.

Most critical are those that are broadly called wage and hour laws. They have a direct bearing on labor cost estimates and controls.

Federal labor laws may come into play too, and a general knowledge of these will help the novice some on the state law problems.

A strong parallel exists between state and federal laws governing wages and hours.

The federal Davis-Bacon Act affords a good example of this parallel.

Under Davis-Bacon, contractors are required to pay prevailing wages on federal projects of more than $2,000. A number of federally aided construction programs are also subject to the prevailing wage requirements under the laws that authorize them.

At present, 40 states have passed laws somewhat similar to Davis-Bacon requiring contractors to pay prevailing wages on public works in the state or its political subdivisions.

Under Davis-Bacon and related laws, prevailing wages are set by the U. S. Secretary of Labor. In at least 28 of the 40 states with similar laws, prevailing wages are determined by state labor commissioners or the public agency that awards the contract. Only one state, Nevada, sets a statutory minimum for prevailing wages on public works—$5 for an eight-hour day.

In the area of general minimum wages, state coverage is not nearly so broad. Only 12 states have set a statutory minimum wage for workers not covered by the federal minimum of $1 per hour. Of the 12, only Alaska's $1.50 minimum is higher than the federal wage floor.

Another area where state labor laws parallel federal legislation is maximum hours, Sunday work and premium pay for overtime. At the federal level, the Fair Labor Standards Act governs maximum hours and overtime pay. But in addition, the majority of states has similar statutes covering workers to whom the federal law doesn't apply.

Work on Sunday, except for charity or necessity, is prohibited in states. However, exceptions are made for certain occupations, such as drug store clerks or gas station attendants.

Overtime work is regulated by law in 16 states. **Half of these states set** the legal work period at eight hours per day and 40 hours per week. Most of them require payment of time-and-a-half for work in excess of these hours. Five other states set a legal day's work at 10 hours.

Most states have statutes limiting the number of hours that may be worked on public projects. In 24 states, eight-hour day is the maximum permitted on public works, except in cases of emergency or necessity. Time-and-a-half must be paid for the overtime work.

Four states — Hawaii, Oklahoma, Rhode Island and Utah—do not prohibit overtime on public works, but require payment of overtime rates for work in excess of eight hours a day.

Many states not only regulate wages and hours but also police the payment of wages, particularly on public works. In 33 states, contractors on public works are required to post payment bonds, guaranteeing payment of wages owed to their employees. In 13 of these states the bonds are required only on projects above a minimum size, ranging from $1,000 to $10,000.

In Pennsylvania, payment bonds are required only on county public works projects. In Wyoming, a standard bond of $1,000 each year is required of public works contractors.

Three states—Montana, Nebraska and Oklahoma—require bonds equal to the contract price. In Massachusetts and Ohio, the bond must equal at least one-half the contract amount, and in New Hampshire a bond of at least 80% of the contract price must be posted.

In Nevada and Oklahoma, the general contractor on public works is liable for wages owed by a subcontractor to his employees.

State labor laws also prescribe the frequency and form of wage payments. At least two paydays per month are required in 22 states. Eight other states require wages to be paid each week on public works.

Three other states—Connecticut, Massachusetts and Maine—require weekly paydays by all employers. In New Mexico, employers must pay wages at least every 10 days.

Wages may be paid by cash or check in 26 states. However, most statutes specify that when payment is made by check, the check must be payable on demand and in the locality of the work. Kentucky and New Jersey allow only cash payment of wages and New Hampshire allows payment by check, if acceptable to employees.

(Next week's article will cover state payroll taxes.)

The 'Denver' case . . .

Can't Be Swept Under the Rug

An old Supreme Court case, known as the Denver Building Trades case, came closer than anything else last week to blocking Senate-House conference agreement on a new labor bill. It is scheduled to come up again in the Senate next year.

Why has the Denver case been thrust into national prominence on such a scale?

The answer lies in a generally recognized fact—the Taft-Hartley Act has never fitted the construction industry. From the union point of view, the Denver case was the first clear indication of some of the inequities the law produced.

The case arose in 1947 on a commercial building project in Denver, when a union general contractor gave an electrical subcontract to a nonunion firm. The Denver Building and Construction Trades Council, members of whose affiliates were working on the job, protested and picketed.

The resulting strike shut the job down until the nonunion subcontractor was forced off the project. The dispute reached the U. S. Supreme Court in 1951 and the strike was ruled an illegal secondary boycott.

Building trades unions claim the decision has had at least three results:

- It has put the unions at a disadvantage, compared with other unions, in organizing nonunion workers.
- It forces union men to work alongside nonunion men against their will.
- It makes it difficult for construction unions in many instances to protect their wages and working conditions.

These results flow from the law's secondary boycott provisions, which seek to protect neutral employers from the impact of labor disputes in which other employers are engaged.

On a construction job on which more than one contractor is working, however, it is usually impossible to isolate the dispute to protect neutral employers, or even to determine with whom the primary dispute exists.

The law gives the benefit of the doubt to employers, rather than unions, because the Supreme Court has made the boycott ban apply whenever one of the several or even incidental objects of a strike is to force one employer to quit doing business with another. Result is that any picketing at a common construction site runs the risk of secondary boycott charges.

An indication that the Denver Building Trades case may not be the proper answer lies in the court's split of 6 to 3 on the decision.

Majority of the court, using the legal doctrine of "independent contractor" to shield the general contractor, dismissed the union contention that the primary dispute was with the general contractor for having hired a nonunion sub. It put the primary dispute in the lap of the subcontractor and said the general contractor was an innocent neutral who could extricate itself only by ceasing to do business with the subcontractor.

The dissenting members said "nonsense." Guided by the "realities of the situation" and not by the fiction of "fortuitous business arrangements," they put all the contractors in the same pot and would have allowed the unions "to protect the job on which union men were employed." They said the boycott ban should restrict the right to strike only where "an industrial dispute spreads from the job to another front."

President Eisenhower, Labor Secretary Mitchell, a Court of Appeals and a number of lawmakers agree with the dissent. They say the community of interest among employers at a construction site prevents the type of neutrality the boycott ban contemplates.

It is this view that will be pushed again next year when another effort is made to remove construction picketing from the boycott ban. And it is one of the issues, like the representation and hiring hall problems, that have made some people—including building trades president Richard Gray—suggest the need for a new and separate labor law for the construction industry.

Labor in Brief . . .

- **New wage pacts signed**—With the exception of the still-striking operating engineers, building trades unions in Birmingham, have signed two-year contracts with the AGC. Carpenters get 25 cents in three installments, other 20 cents in two installments.

- **Moves to protect wages**—In an effort to publicize labor's determination to protect union wage scales and working conditions, the Painters District Council in New York City ordered the 8,500 members of its affiliates to March in the city's Labor Day parade. Those who refuse to march will be fined.

OFFICIAL PROPOSALS

RATE: **The rate for Official Proposal advertising is $2.40 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.**

CLOSING DATE: **Friday 10:30 A.M. for issue dated the following Thursday.**

SEND COPY TO: **Official Proposal Division,**
Engineering News-Record
Class. Adv. Div.,
P. O. Box 12, N. Y. 36, N. Y.

Bids: September 30, 1959.

Construction of Sanitary Intercepting Sewer

CITY OF ITHACA, NEW YORK

Separate bids for the construction of a Sanitary Intercepting Sewer on West Hill and for additions to the Sewage Treatment Plant, City of Ithaca, New York, will be received by the City Clerk in the City Council Chambers, City of Ithaca until 4:30 P.M. September 30, 1959, and then at said time and place publicly opened and read aloud.

WEST HILL INTERCEPTING SEWER: The work to be performed under this Contract consists of the installation of 18", 21" and 24" diameter sewers on the east and west banks of Cayuga Inlet.

SEWAGE TREATMENT PLANT ADDITIONS: The proposed work is designated as: Contract #1, "Tank Construction", Contract #2, "General Construction" and Contract #3, "Electrical Construction".

Under Contract #1, "Tank Construction", the following units are to be furnished and erected: One (1) steel grit chamber, two (2) 85′ diameter steel primary settling tanks, two (2) 122′ diameter steel trickling filter tanks.

The work to be performed under Contract #2, "General Construction", consists of remodeling the existing primary sewage treatment plant, replacing the existing electrical and gas driven raw sewage lift pumps with new units; reconstructing the existing primary tanks into final settling tanks; construction of one (1) new final settling tank; construction of piping between the new steel tanks (constructed under Contract #1), and the existing facilities; construction of the recirculation pump control building complete with pumping equipment; installing rock media and distributor mechanisms in the two trickling filter tanks; installing sludge pumping equipmen and piping in existing building; revising existing chlorinator storage room and installing certain equipment and other miscellaneous items in connection with the construction of a 4,000,000 gallon per day average flow secondary sewage treatment plant.

The work to be performed under Contract #3, "Electrical Construction", consists of construction of a new electrical aerial distribution system, all electrical work in connection with the new treatment units, and revision to the electrical equipment in the existing Control Building.

The Information for Bidders, Plans and Specifications may be examined at the office of the City Engineer, City Hall, Ithaca, New York, or at the office of Stearns & Wheler, Civil and Sanitary Engineers, 99 Albany Street, Cazenovia, New York. Copies of the Plans and Specifications may be obtained at said office of the City Engineer.

Plans and Specifications for the West Hill Intercepting Sewer may be obtained upon payment of $10.00 for each set. Copies of the Sewage Treatment plant Plans and Specifications, which includes Contract #1, Contract #2 and Contract #3, complete in one set, may be obtained upon payment of $35.00 for each set. Any bidder returning plans and specifications in good condition within fifteen days after receipt of bids, will be refunded his payment and any non-bidder, upon so returning such set, will be refunded one-half of his payment.

The City of Ithaca reserves the right to reject any and all bids, and to waive informalities.

Financial assistance will be obtained for these projects from the United States Department of Health, Education and Welfare. The final awarding of each Contract is subject to the approval of the United States Department of Health, Education and Welfare: Public Health Service.

George A. Blean
City Clerk
Ithaca, New York

Bids: October 1, 1959

Notice to Switchgear Manufacturers

CENTRAL ELETRICA DE FURNAS S.A.—BRASIL

Applications for prequalification of Bidders for the manufacture, delivery and commissioning of switchgear, protection, control and metering equipment for operation on a 345 kV transmission system will be received at the main offices of Central Elétrica de Furnas S.A. (FURNAS) at Rua São José 90 - 3º andar, Rio de Janeiro, Brasil, not later than 12:00 noon, October 1st, 1959.

Manufacturers are cautioned to use first class airmail for remittance of applications, and not parcel post, as the latter involves considerable delay in delivery. All packages shall weigh less than 950 grams each, in order to simplify Post Office handling in Brasil.

Tenders will cover the first stage requirements of the Furnas hydroelectric development on the Rio Grande, with four 160 MW generating circuits, three station transmission circuits, three step-down substation circuits, and one three-circuit transmission line switching station, all at 345 kV. Enquiries will cover complete switchgear, protection, control, communication, metering, telemetering, supervisory and related equipment, however applicants may, if desired, submit data for only their specialty, amongst the required equipment, provided such forms a complete and self-contained item.

Applicants for prequalification must submit adequate information on at least the following items:

1. Manufacturing experience on equipment for use with systems of 275 kV and above, and customer reports certifying satisfactory operation records covering at least two years for such equipment.
2. Research, design and testing facilities for high voltage equipment, including circuit breakers, disconnecting devices and instrument transformers.
3. Complete test reports, including all necessary data on test procedures and set-up, for all high voltage equipment proposed.
4. Complete technical data on protection, communication and telemetering equipment proposed, including typical schematical and circuit diagrams.
5. Probable delivery time of each major item.

FURNAS will only consider complete or partial tenders submitted by the manufacturers selected among applicants for prequalification at its sole discretion and judgment. Negotiations with FURNAS shall be held directly by the manufacturer's head offices or through branch offices or subsidiaries in Brasil. FURNAS will not deal with intermediaries or agents.

Invitations for tenders will be issued in October 1959, for submittal by December 1959. Placing of the orders with the successful bidders is scheduled for February 1960.

Bids: October 1, 1959

Sewage Treatment Plant Additions and Improvements—Stage II

ADVERTISEMENT FOR BIDS
FREEPORT, NEW YORK

Sealed proposals for furnishing all material and labor and doing all work for the construction of Additions and Improvements to Sewage Treatment Plant, Stage II, of the Village of Freeport, New York, will be received by the Board of Sewer Commissioners of the Village of Freeport at the Municipal Building, 46 North Ocean Avenue, Freeport, New York, until eight P.M., E.D.S.T., on the 1st day of October, 1959, at which time and place they will be publicly opened and read.

Separate proposals will be received on the four divisions of the work as follows:

Contract A—General Construction, Additions and Improvements to Sewage Treatment Plant, Stage II.
Contract B—Electrical Work, Sewage Treatment Plant, Stage II.
Contract C—Heating and Ventilating, Sewage Treatment Plant, Stage II.
Contract D—Plumbing Work, Sewage Treatment Plant, Stage II.

The information for Bidders, Form of Bid, Form of Contract, including General Conditions, the Specifications, the Plans, the forms of Performance and other surety bonds may be examined at the Office of the Village Clerk, Municipal Building, Freeport, New York, or at the office of Baldwin & Cornelius Co., Village Engineers, Freeport, New York, and copies thereof may be obtained from the Village Clerk upon deposit of Fifty Dollars ($50.00) for each set, to be refunded to bidders upon return of the Plans and Documents in good condition within thirty (30) days after the opening of bids. Such deposit will not be refunded to anyone who takes out such Documents and does not bid on the work.

Documents may be obtained by prospective bidders until four P.M., E.D.S.T., Thursday, September 24, 1959.

Each bidder must deposit with his bid a bid bond in an amount of not less than five percent (5%) of the base bid, and made payable to the Village of Freeport. The form of bid bond may be found on Page C-9.

The successful bidder will be required to furnish a Performance Bond and Labor and Material Bond, having as surety thereon such surety company or companies as are approved by the Board of Sewer Commissioners, each in an amount of not less than 100% of the total amount of the accepted bids.

In submitting a bid, bidders agree not to withdraw their bid within forty-five (45) days after the opening thereof.

The Board of Sewer Commissioners reserves the right to reject any or all proposals and to waive any informality in the proposals received and if awarded, shall award the contract to the lowest responsible bidder furnishing the required security.

EDWARD M. VOELKER, CHAIRMAN
HAROLD K. BLINN
GUSTAV J. BERKEL
BOARD OF SEWER COMMISSIONERS
VILLAGE OF FREEPORT, N. Y.

Bids: September 23, 1959

Request for Bids on One (1) Pneumatic Sewage Ejector

NOTICE TO MANUFACTURERS

Sealed proposals addressed to the Anne Arundel County Sanitary Commission, 300 Baltimore and Annapolis Blvd., N.W., Glen Burnie, Maryland, for furnishing one (1) new current 1959 production Duplex Pneumatic Sewage Ejector, will be received by the said Commission until 7:00 P.M. E.D.S.T., September 23, 1959 when they will be publicly opened and read aloud.

Specifications may be obtained upon application to the Purchasing Agent of said Commission and proposal must be marked: "Bid on one (1) Duplex Pneumatic Sewage Ejector, to be opened 7:00 P.M. E.D.S.T., September 23, 1959".

Only qualified manufacturers of Sewage Ejectors or their designated suppliers will be considered as eligible to receive an award.

The Anne Arundel County Sanitary Commission reserves the right to waive any informalities in or to reject any and all bids as its best interest may require.

ANNE ARUNDEL COUNTY
SANITARY COMMISSION
W. Calvin Gray,
Chairman

Edwin A. DaVault,
Secretary

Bids: October 1, 1959

Notice to High Voltage Transformer Manufacturers

CENTRAL ELETRICA DE FURNAS S.A.—
BRASIL

Applications for prequalification of Bidders for the manufacture and delivery of transformers for operation on a 345 kV transmission system will be received at the main offices of Central Elétrica de Furnas S.A. (FURNAS) at Rua São José 90 - 3º andar, Rio de Janeiro, Brasil, not later than 12:00 noon, October 1st, 1959.

Manufacturers are cautioned to use first class airmail for remittance of applications, and not parcel post, as the latter involves considerable delay in delivery. All packages shall weigh less than 950 grams each, in order to simplify Post Office handling in Brasil.

Tenders will cover the first stage requirements of the Furnas Transmission system, with four 160 NW generating units at Furnas. Operation of the first unit is required early in 1962. There will be included a total of 640 MVA of step-up transformers, and approximately 750 MVA of step-down transformers or auto-transformers.

Applicants for prequalifications must submit adequate information on at least the following items:

1. Manufacturing experience on large water cooled and self-cooled transformers for systems of 275 kV and above.
2. Orders in hand and scheduled deliveries up to 1962.
3. Research, design and testing facilities for high voltage equipment.
4. Drawings and specifications showing a complete construction design for a transformer built and with a satisfactory operating record of at least one (1) year, with a rating of not less than 150 MVA three phase, or 50 MVA single phase, and for a rated impulse level of at least 1200 kV.
5. Available shop space and facilities, including special winding and winding treatment equipment.
6. Probable delivery time for the first step-up or step-down transformers, and to complete the delivery of four transformer banks, starting from the date of signature of the contract.

FURNAS will only consider tenders submitted by the manufacturers selected among applicants for prequalification at its sole discretion and judgment. Negotiations with FURNAS shall be held directly by the manufacturer's head offices or through branch offices or duly authorized subsidiaries in Brasil. FURNAS will not deal with intermediaries or agents.

Invitations for tenders will be issued in October 1959, for submittal by December 1959. Placing of the orders with the successful bidders is scheduled for February 1960.

Bids: October 15, 1959

Notice to Steel Plate Manufacturers

CENTRAL ELETRICA DE FURNAS S.A.—
BRASIL

Bidding for the manufacture and delivery of steel plates for penstocks for the FURNAS HYDRO-ELECTRIC project will be received at main office of Central Elétrica de Furnas S.A. (FURNAS) at Rua São José, 90 - 3º andar, Rio de Janeiro, Brasil, not later than 3:00 P.M., October 15th, 1959.

Tenders will cover mainly the furnishing of:

1. 1400 tons of steel plates, (ASTM A-285, Firebox, type C or equivalent specifications)
2. 1700 tons of steel plates, (ASTM A-212, Firebox, type B or equivalent specifications).
3. 8 expansion joints for 6.50 m diameter penstocks.

Alternate bids shall be submitted for supply of either flat plates or beveled and curved plates.

All materials subject to the bidding should be ready for shipment as follows after the placing of the order with the successful bidder:

1. Flat plates—8 months
2. Curved plates—10 months.

Complete sets of specifications and drawings can be obtained at the Furnas main office, in Rio de Janeiro, Brasil. Manufacturers may also cable RIOFURNAS—Rio de Janeiro—giving firm's name and address in order to obtain the aforementioned documents.

Negotiations with Furnas shall be held directly by the Manufacturer's head offices or their official representatives. Furnas will not deal with intermediaries or agents.

Bids: October 1, 1959.

Relocation of Whirlpool Street and Utilities in Niagara Falls, Niagara County, New York

POWER AUTHORITY OF THE STATE
OF NEW YORK
NIAGARA POWER PROJECT
ADVERTISEMENT FOR PROPOSALS
SPECIFICATION NO. PA-N-23030
NIAGARA CONTRACT N-24

NOTICE TO CONTRACTORS: The Power Authority of the State of New York will receive sealed proposals for the relocation of utilities and electrical work and Whirlpool Street in Niagara Falls, Niagara County, New York, until 10:30 A.M. Eastern Daylight Saving Time on the 1st day of October, 1959, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are:
Estimated:

24,000 cu. yds.	—Excavation
7,700 lin. ft.	—Vitrified clay drain pipe, 4" dia.
4,700 cu. yds.	—Foundation course crushed rock
4,100 cu. yds.	—Reinforced concrete base course
7,700 lin. ft.	—Granite curb
2,900 tons	—Stone filled sheet asphalt and binder
3,800 lin. ft.	—Double beam guard rail
4,050 lin. ft.	—Cast iron pipe, 6" to 20" dia.
4,420 lin. ft.	—Vitrified clay sewer pipe 8" to 48" dia.
17,600 lin. ft.	—Installing 15 kv cable, 250 mcm and 500 mcm

The work shall be completed on or before May 15, 1960.

Plans, Specifications and Proposal Forms for the work may be obtained from the Power Authority of the State of New York, upon application and pre-payment of a fee of Ten Dollars ($10.00) per initial set of contract documents, and Five Dollars ($5.00) per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the Offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 per cent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

PA-N-23030

Bids: September 24, 1959

Contract O&M-472

THE PORT OF NEW YORK
AUTHORITY
NEWARK AIRPORT

ADDITIONS TO BUILDINGS 82 AND 83

Sealed proposals for the construction of additions to Buildings 82 and 83 at Newark Airport, Newark, New Jersey will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 A.M. Thursday, September 24, 1959, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, which will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, September 10, 1959

Bids: September 17, 1959

The Furnishing and Delivery of 345kv Transmission Line Overhead Ground Wire and Phase Conductor

POWER AUTHORITY OF THE
STATE OF NEW YORK
NIAGARA-ADIRONDACK TIE LINE
ADVERTISEMENT FOR PROPOSALS
SPECIFICATIONS NO. PA-9-102
CONTRACT NO. ALP-102

NOTICE TO CONTRACTORS: The Power Authority of the State of New York will receive sealed proposals for the furnishing and delivery f. o. b. specified destinations of 345kv transmission line overhead ground wire and phase conductor for the portion of the Niagara-Adirondack Transmission Line which extends from Niagara County to Onondaga County, New York, until 10:30 A.M. Eastern Daylight Saving Time, on the 17th day of September, 1959, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place proposals will be publicly opened and read aloud.

Bids will be received for the furnishing and delivery of aluminum conductor steel reinforced (ACSR) cable for the transmission line overhead ground wire and phase conductor. Delivery will be required commencing on or before January 1, 1960 and completed on or before February 15, 1961.

The estimated quantities are as follows:

Overhead Ground Wire (190,800 cm, 12/7 stranding)	295 miles
Phase Conductor (795,000 cm, 26/7 stranding)	887 miles

Specifications and Proposal Forms for the work may be obtained from the Power Authority of the State of New York at the Coliseum Tower, 18th Floor, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten Dollars ($10.00) per initial set of contract documents, and Five Dollars ($5.00) per set for additional sets, no part of which shall be refunded. Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than twenty (20) per cent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

PA-9-102

Bids: October 15, 1959.

Feeder Road Program Ministry of Public Works Republic of El Salvador

Bids: November 1959
Prequalification: October 15, 1959
Prequalification Questionnaire
NOTICE TO CONTRACTORS

The Ministry of Public Works of the Republic of El Salvador advises that during the month of November, 1959, the first bidding will take place for the construction of a major portion of the proposed Feeder Road Program of the Country. The Specifications, Plans and Contract Documents will be available for sale in El Salvador on September 21, 1959.

All Contractors interested in taking part in this bidding and in future biddings are requested to obtain copies of the Prequalification Questionnaire which is available in the Office of the Proveedor Especifico de Obras Publicas, Edificio Morazan, 8ª C. P., San Salvador, El Salvador, C. A. These questionnaires must be completed and returned to the Proveedor not later than October 15, 1959.

MINISTRY OF PUBLIC WORKS
REPUBLIC OF EL SALVADOR
C. A.

Bids: October 1, 1959.

Correction Notice

The bid date on the Construction of the Oyster Shell Crushing Plant and Ancillary Services, advertised in the August 27th, 1959 issue of ENGINEERING NEWS RECORD, has been changed from October 8th to October 1st, 1959. The time has been changed from 5:00 P.M. Central Standard time to 11:00 A.M. Central Standard time. For further information, contact the Board of Commissioners of the Morgan City Harbor and Terminal District, City Hall, Berwick, Louisiana.

Bids: September 17, 1959.

Cleaning and Painting Movable Dam

NOTICE TO BIDDERS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Canal Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., on September 17, 1959 by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, the Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract M 59-10 for Cleaning and
Painting Movable Dam 10, Erie
Barge Canal and Bridge E-44
Montgomery and Oneida Counties,
New York

Engineer's Estimate for M 59-10 is $33,000. Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor The Gov. Alfred E. Smth State Office Bldg., Albany, New York.
(b) Department of Public Works, 270 Broadway, New York City, New York.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract M 59-10 may be examined and obtained at the office of Mr. Lacy Ketchum, 109 No. Genesee St., Utica, New York.

The deposit for Plans and Proposal Forms for Contract M 59-10 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Proposals for Contract M 59-10 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" in the amount of $1,700.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Canal Law and Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: September 29, 1959

Contract LGA-290.002

THE PORT OF NEW YORK
AUTHORITY
LA GUARDIA AIRPORT

TAXIWAY AND APRON PAVEMENT

Sealed proposals for the construction of taxiway and apron pavement at LaGuardia Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, September 29, 1959 at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design of the Authority, Room 1115. Documents will be furnished upon deposit of $10.00 per set for not more than three sets to any one company, each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $10.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, September 10, 1959

Bids: September 17, 1959

Miscellaneous Work on Erie Barge Canal

NOTICE TO BIDDERS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Barge Canal Improvement Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., September 17, 1959 by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, the Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract U.S. 99 for
New Gates, Lowering the
Lower Sill, Replacing the
Upper Sill and Other Misc.
Work at Lock 19, Erie Barge
Canal, Herkimer County, New York

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Gov. Alfred E. Smith State Office Bldg., Albany, New York.
(b) Department of Public Works, 270 Broadway, New York City, N. Y.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract U.S. 99 may be examined and obtained at the office of Mr. Lacy Ketchum, 109 No. Genesee St., Utica, New York.

The deposit for Plans and Proposal Forms for Contract U.S. 99 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's Estimate of Cost for Contract U.S. 99 is confidential and will be made known after all bids have been opened.

Proposals for Contract U. S. 99 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of five percentum, (5%) of the bid. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Barge Canal Improvement Law and to the Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: October 6, 1959

Electrical Work at the Lewiston Power Plant, Lewiston, Niagara County, New York

POWER AUTHORITY OF THE
STATE OF NEW YORK
ADVERTISEMENT FOR PROPOSALS
SPECIFICATIONS NO. PA-N-25031
NIAGARA CONTRACT NO. N-22

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the electrical work at the Lewiston Power Plant and appurtenant works, located in Lewiston, Niagara County, New York, until 10:30 A.M. Eastern Daylight Saving Time on the 6th day of October, 1959, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The work includes but is not limited to the installation of Authority furnished equipment and materials consisting of all generator auxiliaries, isolated phase bus, secondary unit substations, motor control centers, main switchboards and appurtenances, control batteries and associated equipment, lighting systems, and insulated wire and cable; the furnishing and installing of miscellaneous electrical equipment, conduit and grounding, and cable trays; and making electrical connections to equipment of a basically non-electrical nature such as pumps, air compressors, heating, air conditioning and ventilating fans including electric duct heaters, hoists and elevators, transformer fire protection equipment and other equipment installed or furnished and installed by Others.

The work shall be completed on or before July 2, 1962.

Plans, Specifications and Proposal Forms for the work may be obtained from the Power Authority of the State of New York, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Twenty Dollars ($20.00) per initial set of contract documents, and Ten Dollars ($10.00) per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 per cent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

PA-N-25031

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5235) will be received at Ogden, Utah, until 10 a.m., Mountain Standard Time, October 8, 1959, for furnishing labor and materials for earthwork, pipe lines, and structures for Woods Cross Lateral System, Part 1, Weber Basin Project, Utah. Location north of Salt Lake City, Utah. Principal items are 28,430 cu. yds. excavation; 350 cu. yds. concrete; 16,000 lin. ft. concrete pressure pipe, 12 to 30-inch; 20,000 pounds steel pipe and miscellaneous metalwork; and other work. Completion time 230 days. For particulars, address Bureau of Reclamation, P. O. Box 387, Ogden, Utah; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

Sealed bids will be received in the office of the Engineering and Construction Director, Panama Canal Company, Balboa Heights, Canal Zone, until December 2, 1959 and will be publicly opened then for construction of the superstructure of Balboa Bridge, 5,425 ft. long. The main span will be cantilever arch truss type 2,243 ft. long, consisting of two anchor arms and two cantilevers and a tied arch suspended span totaling 1128 ft. Main trusses will be 140 ft. above main piers, now under construction, while the upper chord of the arch truss will be 370 feet above the mean high water. The approach spans will be 3,182 ft. long, on 5% grades, joined at the crest with a 1,600 ft. vertical curve. The work consists of furnishing and installing 6,250 tons of structural carbon steel, 7,450 tons of low alloy steel, 13,500 linear feet of wire rope suspenders, 625 tons of reinforcing steel, and 5,500 cubic yards of concrete. The work will also include installation of aluminum railings, mercury vapor roadway lighting, navigation and aviation obstruction lighting and utility lines. Plans and specifications are available for examination in the Procurement Office, Panama Canal Company, 21 West Street, New York 6, New York. Complete sets of data may be obtained upon payment of $100 deposit. Checks shall be made payable to the Panama Canal Company. For further information contact this office or call Bowling Green 9-5380, extension 73. Reference PC 60-6.

Contractors Watch

This Section—

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

CHIEF ESTIMATOR

Immediate opening available for position as Chief Estimator of Building Division. Applicants must be thoroughly experienced and capable in all phases of building construction and ready to assume immediate and complete charge of Estimating Department. Send complete resume of qualifications attention R. W. Card, P. O. Box 191. PERINI CORPORATION, FRAMINGHAM, MASSACHUSETTS.

ADDRESS BOX NO. REPLIES TO: Box. No.
Classified Adv. Div. of this publication.
Send to office nearest you.
NEW YORK 36: P. O. BOX 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

Asst. Prof.—To teach undergrad. courses in transportation, surveying, and fluid mechanics. Salary open. Civil Eng., University of No. Dak., Grand Forks.

Wanted: Young graduate Civil or Hydraulic Engineer interested in overseas assignment with consulting firm. State education, background and experience. Reply fully to P-2359, Engineering News-Record.

Graduate Civil Engineer with at least two years experience in layout of water mains, small pumping stations and filter plants. Send resume of experience, references, salary desired, date available to Gannett Fleming Corddry & Carpenter, Inc., Box 366, Harrisburg, Penna.

We are seeking Engineers and Construction men on the Vice-President level for International operations. Minimum investment opportunity $15,000.00 if rigid qualifications are met. Salary and profit sharing plan. Send resume to P.O. Box 722, University Station, Montreal, Quebec.

One senior mechanical engineer and one senior electrical engineer fully experienced in all phases design of mechanical and electrical respectively for all types of buildings. Mechanical engineer to have thorough knowledge of air conditioning design. Both positions permanent with established consulting engineering firm in south Florida. Send complete resume of education, experience and salary requirements. P-2260, Engineering News-Record.

Mechanical Design Engineer: Pulp and Paper Mill machinery and equipment design. Equipment and material selection, specifications and layout. Minimum 4 years' design experience, preferably in the pulp and paper industry. Engineering degree required. Salary commensurate with ability. Send resume to: Personnel Manager, West Virginia Pulp and Paper Company, Luke, Maryland.

Railroad Track Construction Engineer-Estimator must be capable of bidding and executing work for Private Track Contractor fully equipped with modern track laying equipment. State background, experience and salary required. Excellent opportunity for right man. Reply to: P.O. Box 274, Cincinnati 14, Ohio.

Job Superintendent—minimum 5 years experience as superintendent or carpenter foreman on concrete projects preferably in water and sewage tank field. Gunite experience helpful but not essential. Travel required. Submit resume with references, recent photograph, and salary requirements. Reply to P-2483, Engineering News-Record.

Estimator Wanted General Construction— Must be familiar with take-off, pricing, purchasing, sub-contracts. Excellent opportunity, General Contractor located near Chicago. Reply fully covering experience, personal data, and salary requirements. P-2494, Engineering News-Record.

Civil Engineer for materials research in ice at the University of Alaska and Office of Naval Research Arctic Research Laboratory, Barrow, Alaska. H. R. Peyton, Arctic Res. Lab., Box 1070, Fairbanks, Alaska.

City Engineer, Albany, Oregon. Population 14,900. Salary $500-$630. Requirement: Oregon registration as Professional Engineer. Apply to City Manager, P.O. Box 490, Albany, Oregon by October 5.

Construction Estimator Wanted—We have wonderful opportunity for you if you are hard working, intelligent and ambitious. Good salary plus profit sharing for qualified applicant. Only man experienced in large institutional and industrial construction need apply. Location—Milwaukee. Send resume of age, education and experience to P-2486, Engineering News-Record.

(Continued on the following page)

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

DISPLAYED RATE:

The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch in measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

SEPT. 24TH
ISSUE
CLOSES
SEPT. 14TH

UNDISPLAYED RATE:

$2.40 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW Ads and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

The Commonwealth of Pennsylvania Seeks

HIGHWAY & BRIDGE DESIGNERS

with C.E. degree and 1 to 5 years of design experience.

• JUNIOR DESIGNERS • DESIGNERS • SQUAD LEADERS • SUPERVISORS

Salaries from $5500 to $9000 per year based upon qualifications.

make application immediately

PERSONNEL, PA. HWYS. DEPT., HARRISBURG, PA.

GENERAL FOREMAN

Major Steel Company has need for top notch man with college background to supervise construction crews installing fabricated products in Midatlantic area. Projects include Tunneling, Jacking and Boring. Attractive starting salary with company car, expenses and bonus plan.

P-2488, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

PLANNER

Community Planner I. $5244-$6036. Starting salary above minimum rate for outstanding qualifications. Longevity rates above maximum salary for long service. Degree in City Planning, Architecture, Engineering or related fields. To participate in the preparation of the various aspects of urban renewal plans.

CITY PERSONNEL DEPARTMENT
404 City-County Bldg., Madison 9, Wis.

OPPORTUNITY for SERVICE MANAGER

at leading Midwest Construction Equipment Distributor

The man we're looking for is probably the first or second man in the service department of a contractor or heavy equipment dealership. He has management ability—gets along well with people—understands construction equipment—can teach others to understand it, too. He's ambitious and worth a lot more money than he's making. If you're this man, write us, telling your background, experience, salary expected, availablity. Enclose a photo. Inquiries handled with strict confidence.

P-2541, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

Specialized Machine Designer

for employment with a major Chemical Company in the Gulf Coast area. Applicants must be qualified and experienced in the intricate design and application of reciprocating and rotary motion, and energy conversion. A thorough knowledge of metallurgy, thermodynamics and harmonics is essential.

Send resume and salary requirements to:

P. O. Box 88025, Houston 4, Texas

Interviews arranged for qualified applicants only.

All replies will be held in strict confidence.

ENGINEERS

OVERSEAS IRRIGATION PROJECT

Long established firm of consulting engineers with world-wide practice has following immediate openings on system for 30,000 acre irrigation project in JORDAN.

IRRIGATION AGRONOMIST

Qualified to work with designers on farm unit layout. Position requires technical education and extensive background in commercial agriculture and agriculture economics.

EARTH & MATERIALS INSPECTOR

Qualified inspector with extensive experience in earthwork and concrete construction. Experience in location, investigation and testing of materials and measurement of quantities for payment also required.

CONSTRUCTION SUPERINTENDENT

Experienced, capable of getting work done by local personnel with a minimum of equipment. Responsible for organization, efficient operations, quality and speed of construction.

All positions will involve training of Jordanian personnel. Two year contracts, some living expenses and other fringe benefits. Send complete detailed resume to personnel Department.

HARZA ENGINEERING COMPANY
400 W. MADISON ST.
CHICAGO 6, ILLINOIS

STEEL BUILDINGS ENGINEER

Here is an opportunity for an engineer to actually engineer a whole continuous project rather than technician a small part of the project only. Graduate mechanical or structural engineer preferred. Must have had definite design experience with a manufacturer of steel buildings. Hutchinson, Kas. location. Products involve mainly steel grain storage buildings and utility farm buildings.

Prefer that the man have the potential to lead others. He should be inclined to be inventive and skilled in developmental work. He will be the nucleus for computations, planning, ideas to be developed by designers, and liaison functions with tooling and shop production. He should be cost conscious and able to contribute to good shop cost accounting. This is a newly created opportunity due to our expanding and adding this new product. We are the largest industry headquartered in Kansas City. Send confidential resume stating education, age, the extent of your steel buildings designing experience, and salary thinking. Reply by mail only.

CONSUMERS COOPERATIVE ASSN.

P. O. Box 7305 Dept. 16 K. C. 16, Mo.

ENGINEERS

STRUCTURAL ARCHITECTURAL

Leading midwestern manufacturing firm with facilities in U. S., Canada and abroad has openings in its engineering and architectural departments. Work includes design and supervision of construction of large industrial, commercial and office buildings. Preferred age: 25-40. Please furnish resume of experience and education, salary requirements, and availability.

P-2542, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill

POWERHOUSE SUPERINTENDENT

Superintendent of power plant located in Iran. Must be university graduate, with degrees in Electrical Engineering preferred, or have the equivalent in engineering experience. Should have at least two years experience as service operator in hydroelectric powerhouse. Working knowledge of plant equipment necessary. Complete responsibility for disassembly repairs and reassembly of major equipment. Salary commensurate with ability. Living allowance and other fringe benefits. Initial two year contract with possibility of renewal. Send complete detailed resume of experience and qualifications to Personnel Department.

HARZA ENGINEERING COMPANY

400 W. Madison St., Chicago 6, Illinois

Manufacturer's District Representative North East Territory

Excellent opportunity—Experienced in underground excavating equipment.

THE PARSONS COMPANY
Division of Koehring Company
NEWTON, IOWA

COMPUTER ENGINEER

Registered Graduate Civil Engineer with 5-year minimum design experience in highways and bridges. Some computer experience desirable. Responsible, permanent position in our Bendix G-15 Computer Division. Salary open. Send resume to:

RICHARDSON, GORDON AND ASSOCIATES
3 Gateway Center, Pittsburgh 22, Pennsylvania

• *POSITIONS VACANT*

(Continued from preceding page)

Experienced Architectural Draftsmen. Excellent opportunity with established consulting firm in Middle West. State education, experience, and required salary. Reply to P-1545, Engineering News-Record.

Wanted—Experienced Party Chief, licensed land surveyor preferred. Excellent opportunity with well known Consulting Firm in Illinois. State education, experience and required salary. Reply to P-2292, Engineering News-Record.

Highway Design Engineer—Soils. Engineering background. Minimum 3 years experience. Permanent position Southern Connecticut. Send resume of experience, references and salary requirements. P-2562, Engineering News-Record.

Engineers—Structural Steel Sales Promotion. We are searching for two Civil or Architectural Engineers, preferable age 30 to 45, to handle technical and promotional work with customers of the structural steel fabricating industry. Headquarters will be in our district offices at Pittsburgh, Pennsylvania, covering western Pennsylvania, and West Virginia, and at Syracuse, New York, covering upper New York state. Moderate travel required. Applicants should have a B.S. in C.E. or A.E. and preferably be registered. Experience in bridge and building design and construction in both steel and concrete required. Salary open, depending upon experience. Insurance and retirement plans available. Send complete resume, recent photo if available, and salary requirements by mail to American Institute of Steel Construction, Inc., 101 Park Avenue, New York 17, New York.

Civil Engineers experienced in design of sanitary engineering projects or in related fields, including one experienced and qualified specification writer. Mid-West location. Please send complete resume. P-2556, Engineering News-Record.

Salesman Steel Weldments and Assemblies by Chicago division of National Organization. Excellent opportunity for aggressive man with proven record and contacts. Salary and commission running into five figures for successful man. Write complete details to: P-2561, Engineering News-Record.

• *POSITIONS WANTED*

Construction Supt. and Reg. Engineer desires sewer work. Both have extensive heavy construction experience. Will assume responsibility for engineering, layout, and field supervision for salaries plus % of profit. P. O. Box 6336, Columbus, Ohio.

Equipment Maintenance superintendent. For heavy construction co. Top level manager thoroughly experienced in repair and preventive maintenance. Age 36, foreign or domestic. PW-2344, Engineering News-Record.

Executive, female, Legal & Const. Background, Exp. Administrator, Mgr. Govt. Contracts Etc. PW-2521, Engineering News-Record.

Civil Engineer, BSCE, 36, married. Ten years structural design, contract management and administration. Gov't and private industry. Willing to travel some, wants to change. PW-2515, Engineering News-Record.

Construction Superintendent: Age 52, 30 years of heavy construction—prefer S.E. location—Best References. PW-2510, Engineering News-Record.

Rock man experienced free to travel. PW-2474, Engineering News-Record.

Field Office—Experienced—Asst. to project mgr. or engineer timekeeping, cost, payroll, personnel, purchasing, office. Mobile-readily available. PW-2514, Engineering News-Record.

Field and layout engineer B.S.C.E. 18 years experience—steam plant, lock, dam, and building-supervision several parties—charge of civil, structural and architectural aspects of related construction. E. E. Boudman, 101 Fernwood Avenue, Elmira, N. Y.

Graduate Civil Engineer, age 32 years. 2/3 of P.E. exam. passed. 6 years as project engineer on road and bridge const. Present salary $10,000. Prefer management or administration position, but will consider all offers. PW-2511, Engineering News-Record.

• *POSITIONS WANTED*

Project Manager hvy. const. B.S.C.E. Highways, flood control, etc. presently employed. Prefer West Coast. PW-2520, Engineering News-Record.

Construction Engr. Civil-Mech. B.S.C.E. 19 yrs. heavy constr. Design, Superv, estimating, specifications, field layout, soils, planning. Industrial, commercial, military, highway, marine, p.o.l., power plants. Fluent French, Spanish, Italian. Some Arabic, Turkish. Available 1 Jan. PW-2502, Engineering News-Record.

Construction Superintendent experienced on hiways and airfields. Producer. PW-2512, Engineering News-Record.

Constr. Supt., or Prod. Mgr.—C.E., 25 yrs. constr. exp., matured, competent and capable of assuming full responsibility for general heavy construction. PW-2484, Engineering News-Record.

Millwright Superintendent: Fast, Capable and Sober. Prefer South or Southwest. PW-2519, Engineering News-Record.

Construction Executive: Presently vice president, treasurer and director of large international engineering and construction firm. Responsible for financial, banking and tax matters, as well as general business operations. Experienced in all phases management control, corporate administration. Have formed and operated foreign companies. Broad engineering and construction experience—estimator, engineer, superintendent, general manager. Member ASCE, Military Engineers, The Moles and American Management Assoc. PW-2138, Engineering News-Record.

Purchasing: General Construction. Excellent experience large & small jobs. Well versed in office mgmt, equip. and material procurement. Some experience with state and federal contracts. PW-2424, Engineering News-Record.

Construction Executive or Project Mgr. 25 years experience covers Concrete, Earth Dams, Power houses, Bridges, Tunnels and Marine Construction. Qualified to Estimate, Plan and Construct in the U. S., South Amer. and Middle East. PW-2271, Engineering News-Record.

Supt. or General foreman—age 43—over 18 years experience highway construction supervising earthmoving equipment, excavating, drainage. Know men, methods and cost. Available at once. A-1 references. PW-2490, Enginering News-Record.

Controller-Office Manager. Presently employed Controller-Treasurer of Mid-Western General Contractor. College and twelve years experience all construction. Complete financial statements, taxes, insurance, payrolls, cost systems and budgetary controls. Age 35, married. Will relocate. PW-1811, Engineering News-Record.

Engineer. B. S. C. E., P. E., Graduate study. Nine years well rounded responsible office experience including structural steel, concrete, and civil engineering for buildings, plants, and highway projects. Want high potential position in New York area. PW-2563, Engineering News-Record.

Concrete draftsman-checker, power plant exp. wants to locate Ga. or Miss. Employed in Ala. PW-2553, Engineering News-Record.

Construction Manager, Architect-Engineers, Owners Representative. Age 48, P.E. 30 years experience all types of construction. Previous background manager, Chief Engineer, General Superintendent, Chief estimator. Since 1955 have had responsible supervision and field management of thirty-million dollars worth of work. Will relocate. PW-2554, Engineering News-Record.

Seek Career Challenge to further outstndg. capabilities. Ten yrs. experience all phases Administration, Payroll, Cost Control, Purchasing, Property Accountability. Presently employed, general contractor—dead end. Author Administrative Procedure Manual. Consider foreign assignment. PW-2493, Engineering News-Record.

• *SELLING OPPORTUNITY WANTED*

Manufacturers' Agent has office and warehousing for conducting business. Interested in obtaining related items in construction industry. Have large following among architects, engineers and contractors in Michigan, Indiana, Ohio and Wisconsin. RA-2530, Engineering News-Record.

SEARCHLIGHT SECTION CLASSIFIED ADVERTISING

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The advertising rate is $25.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured 7/8 inch vert. on one col., 3 columns—30 in. to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

UNDISPLAYED RATES

$2.40 a line, min. 3 lines. To figure advance payment count 5 average words as a line.

BOX NUMBERS count as one additional line in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads.

STRUCTURAL ENGINEERING
ARCHITECTURAL ENGINEERING
OUR COURSES of instruction by mail HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations. Forty-eighth year.
[illegible]
WILSON *Engineering Corp.*
College House Offices HARVARD SQ. CAMBRIDGE MASS.

SURVEYING INSTRUMENTS
USED • REBUILT • SALE
RENT • REPAIRING

TRANSITS & LEVELS

Various Makes
NEW & REBUILT

Fully equipped modern shops — all makes and models repaired — all work guaranteed — prompt service — complete line field supplies.

INSTRUMENTS RENTED

Midwest Representatives: W. & L. E. Gurley, Distributors—Filotecnica Salmoiraghi

NATIONAL BLUE PRINT CO.
Established 1914
210 S. Canal St. Chicago (6), Ill.

TRANSITS AND LEVELS

New or Rebuilt
Sale or Rent

Headquarters for REPAIRS — any make — Factory Service. We will also buy your old instruments or take them in *trade*.

A complete line of Engineering Instruments and equipment for field or office. Write for catalog NLR 99.

WARREN-KNIGHT CO.
Manufacturers of Transits and Levels
136 No. 12th St., Philadelphia 7, Penna.

ALL MAKES

RE-BUILT
REPAIRS
RENT
REAL EXPERTS
BUFF
69 Day St., New York WOrth 2-2797

If there is anything you want
that other readers can supply
OR . . . something you don't want—
that other readers can use—
Advertise it in the
SEARCHLIGHT SECTION

Need A "Lift"?

CRANES, INC.

RENTALS

Manitowoc 3900's — **Crawlers** 3500's
Latest Models
Long Booms and Jibs

TRUCK CRANES

Link Belt and Bay City, Cap. to 40 Tons. Booms to 200 ft. Hoists—Welders—Generators

Maspeth 78, N. Y. ST 4-1776

FOR SALE

MANITOWOC 3000-B
BACKHOE ATTACHMENT

SERIAL #3377—NEW 1957
ESCO 2 CU. YD. BUCKET
Like New Condition

THE AL J. GOODMAN & SONS CO.

P.O. Box 3237
Forest Pk. Sta.
Little Rock, Ark.
MO 4-1523

P.O. Box 263
Asheville, N. C.
AL 3-6456

SPECIAL

FOR SALE OR RENT
2 - Bucyrus-Erie
Model 71-B shovels
complete—New—June 1958
TIP-TOP SHAPE
Located Niagara Falls, N. Y.

EASTERN EQUIPMENT SALES, INC.
Springfield, Mass.
REpublic 7-2656
Orange, Conn.
SYcamore 9-2384

MANITOWOC 3500, 1949, crawler

38" x 18' thick. 80' boom, 2½ yd drag-line bucket, air control. $37,500.

R. J. KEHOE CO.,
1 E. 42nd St., N.Y.C.—17

ELEVATED WATER TANKS

Dismantled, moved and re-erected or all new units—erected anywhere. Advise capacity, tower height and location.

W. E. CALDWELL CO.
Box 41 Station E Louisville, Ky.
Melrose 7-2576

AN AUCTION

STEEL RIVER FLEET

Tues. Oct. 6, 10:00 am, ATCHISON, KANS., on the Missouri River, just South of the Hiway Bridge. Motorboat 220 hp, 1 GMC 6-110, 40.5' x 12.4' x 5'; Motorboat 220 hp, 1 Cummins diesel, 39.6' x 10.4' x 5'; Motorboat 167 hp, 1 GMC 6-71 engine, 40.5' x 10' x 4'; Motorboat 167 hp, GMC 6-71 engine, 34.4' x 9.5' x 4.5'; 2 Barges, 110' x 26' x 6', like new; Pile Driver, Oil fired, 70' x 26', No. 2 Vulcan Hammer 60' leads hinged; Pile Driver, Coal fired, 70' x 26', No. 2 Vulcan Hammer 57' leads hinged; Dredge, 20' x 40', 10" Pump, GMC 6-71 diesel, 370' dredge pipe; 6 Pontoons, 12' x 24' interlocking, portable; 3 Pontoons 15' x 30'; 2 Yaun Rock Buckets; other items.

WRITE—WIRE—CALL Auctioneers for complete list. INSPECT after Oct. 1st at sale site. TERMS: Complete Payment Sale Day. Each Piece Positively Sells to Highest Bidder!

W. A. LYNN CONST. CO., Owner
Lincoln, Nebr. *Phone 2-3246*

FORKE BROTHERS
THE AUCTIONEERS
LINCOLN, NEBRASKA
321 Sharp Bldg. *Ph 2-1045*

FOR SALE

DORR SEWAGE DISPOSAL PLANT

Capacity With 3 Electric Pumps, 1,512,000 Gals 24 Hrs.

Lift Station INFILCO, Vertical Grinder, 3 Fairbanks Morse, close coupled, 350 GPM, 1150 RPM, 45 TDH. Switchboard, Remote Controls, Valves, Checks, Etc.

Clarifiers First and Second #1—Steel 45' Dia. 10' Height, with head boxes, Scum sweeper, Scum pit, Motors, Etc. #2 Steel 45' Dia. 10' Depth Sweeps, Motors, Etc.

Biofilter 85' Dia. Four Arm mounted on Mercury bearings

Digester 30' Dia. 25' 6" High. DORR #2500 Two direction mixing arms, motors, Gas collecting head, etc

Pump House DORR, Sludge pump type S. A. 3, H.P. 75 GPM. Two recirculation pumps, 1150 RPM, 15 TDH. Valves, Checks, etc

Chlorinators Wallace & Tiernan, A 677, 417, Etc., Etc.

Gas Burner Varec, #50 Flame Arrester, #5800 Burner

Control Panel Switches, Remote Controls, Etc. Etc

This disposal plant is large enough for a town of 25,000 population if you have the right amount of outfall.

Sale Price $35,000.00
Cost of dismantling and removal to be that of Purchaser.

R. R. KELLOGG c/o STARDUST HOTEL
Las Vegas, Nevada

CRANES FOR RENT

CRAWLERS Capacities to 60 tons
Booms to 180 ft.

TRUCK CRANES Capacities to 35 tons
Booms to 130 ft.

P & H. Lima and Manitowoc.
Top-Condition erection cranes

ROGER SHERMAN
CRANE SERVICE, INC.
East Hartford, Connecticut JAckson 8-4106

Complete 16 ft. Diameter Tunnel Spread

Concrete forms, 4", 6", 8", 24" Spiral Welded Pipe, Locomotives, Muck Cars, Tunnel Agitators, Pumps, Pumpcrete machines, etc. For information and catalogue, write or phone

WESTERN CONTRACTORS SUPPLY CO.
4817 Lake St., Melrose Park, Ill.
CO. 1-8875 FI. 5-0690

FOR SALE

EUCLIDS: Rear, Bottom and Scrapers
9W Bucyrus-Erie Dragline, 8½ yd.
5W Bucyrus-Erie Dragline, 5 yd.
200W Bucyrus-Erie Dragline, 6 yd.
170B Bucyrus-Erie Shovel, 6½ yd.
120B Bucyrus-Erie Shovel, 5 yd.
54B Bucyrus-Erie Shovel, 2½ yd.
38B Bucyrus-Erie Shovel, 1½ yd.
80D Northwest Shovel, 2½ yd.
4500 Manitowoc Dragline, 5 yd.
3000 Manitowoc Dragline, 1¾ yd.
2400 Lima Dragline, 6 yd.
1201 Lima Dragline, 3 yd.
1½ yd. Marion Shovel. New in 1956.

SHOVELS—DRAGLINES—CRANES
(All sizes, makes, Crawler and walking type)

WILLIAM LUBRECHT, III
Construction Equipment
311 W. Diamond Ave. Hazleton, Pa.
Telephone GI 5-4041 or 5-0253

FOR SALE

2—FLYGT B-200 L 8"
SUBMERSIBLE ELECTRIC PUMPS

Rebuilt by factory equal to new, and guaranteed. Complete with starter and cables.

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Editorials

No Holds Barred

TIME WAS, NOT SO LONG AGO, when the proposal by New Jersey's governor to use the surplus earnings of the New Jersey Turnpike to subsidize the state's commuting railroads would have been considered sheer heresy. But that was in the days when we had what we called self-liquidating projects. We still have the projects, but they are now called "revenue producing." Somewhere along the line the fine old term "self-liquidating" has been dropped from the language. Or when still used the term has lost its original meaning. Perhaps this was inevitable, but it seems a pity.

Self-liquidating, as originally used, was in the class of exact terminology. It meant what it said. A project, through its earnings, paid off its investment. Moreover, when the investment was paid off, the project was supposed thereafter to be free. There have been projects, particularly some toll bridges, that followed this pattern. There have also been some which, when earnings piled up faster than bond interest and amortization required, reduced their charges.

Such happy conclusions to the true self-liquidating process, however, have not been numerous. Most self-liquidating projects, of course, have not been in existence long enough to pay off, and now it seems that many of them never will. The reason is that a really successful self-liquidating project is too good a thing to let go. By a convenient shift in thinking, it can be considered a revenue producing project. And then, since other projects are continually needed, it becomes very easy to let the successful one carry them—much easier, in fact, than to raise taxes or to sell bonds secured only by the new projects.

Usually, however, a successful project's earnings have been used for other projects of like kind. The New Jersey proposal, approved by the state legislature last week for submission to the voters this fall, completely departs from this pattern. Here the users of one form of transportation, highways, are being asked to pay for another form of transportation, railroads. Actually, there are precedents for this sort of thing, notably the Port of New York Authority whose revenue bonds cover facilities for all kinds of transport except railroads—i.e. highway bridges and tunnels, airports and ocean piers. Individual Port Authority projects, however, could conceivably stand on their own, whereas New Jersey may be taking on a perennial loser in the commuter railroads.

Based on the classical standards for self-liquidating projects, New Jersey's proposal is a distinct violation of principle. Yet faced with an emergency—and it would be truly that if the commuting railroads stopped running because they couldn't pay their taxes—the state, in effect, justifies the violation by viewing the Turnpike not as self-liquidating but as revenue producing. Some further justification is squeezed from the fact that the plight of the nation's railroads—and not only the commuter lines—is partly due to highway competition. In any event, the emergency in New Jersey is such that the legislature considers that no holds should be barred in seeking the money to meet it. The important point to date is that, if the proposal is adopted, precedent could conceivably be set for a new principle, namely transportation is so indivisible that revenue from all its forms can justifiably be pooled in order to make the whole system work. The outcome in New Jersey may thus have nationwide implications.

The Public Works Veto

IN FAILING TO OVERRIDE President Eisenhower's veto of the civil works appropriation bill, Congress added to the President's record of making his vetos stick.

The $1.2-billion appropriations measure would have provided funds for some 75 new construction starts on projects ultimately to cost about $800 million (ENR Aug. 20, p. 21). It was these new starts that brought the veto as the President plugged with consistency for his ideal of a balanced budget. And it is now likely that whatever appropriations do pass will not include money for so many new starts.

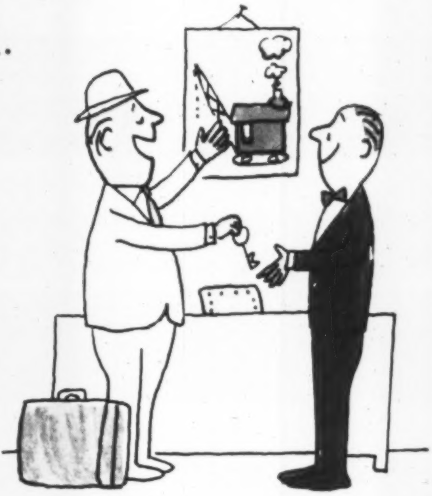
There is, of course, always strong local support and often pressure, from the states and communities that benefit, for the start of new, needed federal works projects. And Congressmen usually react to the pressure in a fairly magnanimous way, approving as many new construction projects as they can by spreading out the total to be appropriated as far as they possibly can.

This year the Administration's determination to balance the budget was recognized as an obstacle to this procedure. Congressional strategists therefore sought to avoid a veto by trimming sail on some new starts and making all those they included fit within a dollar total they thought the President would accept. But the strategy didn't work; the veto came anyway.

It is important to realize in relation to this fight over federal public works that the new construction starts at issue are not those projects most vitally needed to reverse the current downturn in public works construction. Whether or not these particular projects are started in the current fiscal year won't much affect the adverse trend that ENR has flagged (ENR Aug. 27, p. 74). For federal public works money is traditionally slow to be spent even after a project gets started. More important than these new federal projects to the darkening public works picture are the very many more state and local public works projects for which a need exists. If financing can be arranged for them, the new federal starts will not be missed in the total of public works projects chalked up in the next twelve months.

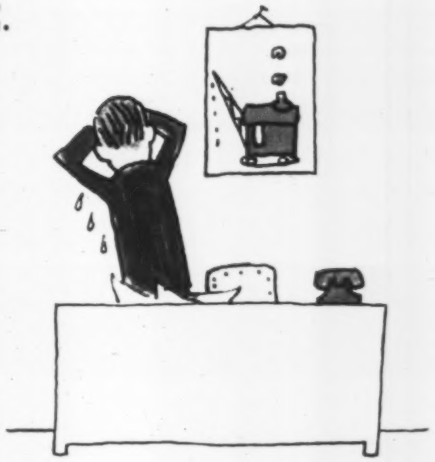
Builder Tully's words of wisdom

1.



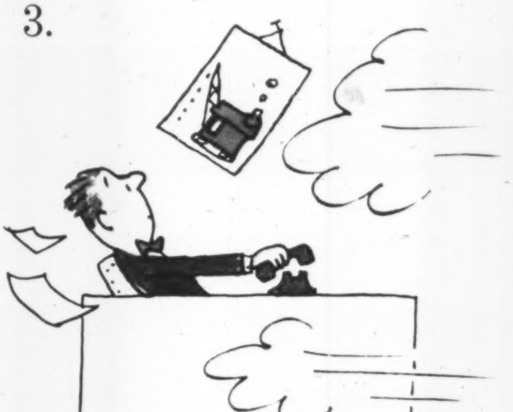
"I've been a builder forty years," Phil Tully told his boy,
"I'm giving you my company, my greatest pride and joy."
Now, sound advice was also part of Tully's legacy:
"Get Travelers for construction bonds—a solid policy."

2.



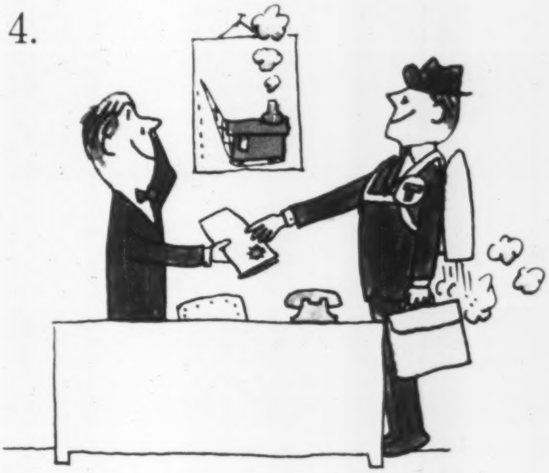
As boys are wont to, Tully, Jr. flouted Dad's advice—
He figured bonds were all alike, and *any* would suffice.
He did not call The Travelers when a big job came along:
He couldn't enter *any* bid—his bond was late and wrong.

3.



"I'll never make the same mistake again," our hero swore
"My patriarch advised me right: it's Travelers evermore."
That day he called The Travelers, "Hasten! Satisfy my need:
I want a bond—I want it fast—with supersonic speed."

4.



He hung the telephone back up and wow! Was he surprised—
Before his eyes was Travelers' man, as fast as advertised.
Why let a tardy bond derail *your* well-laid bidding plan?
For speedy bonds and expert service get a Travelers man.

NOTE: *Comp. Equipment Floaters—Builders' Risk Insurance, too*
Are other ways The Travelers helps a contractor like you.

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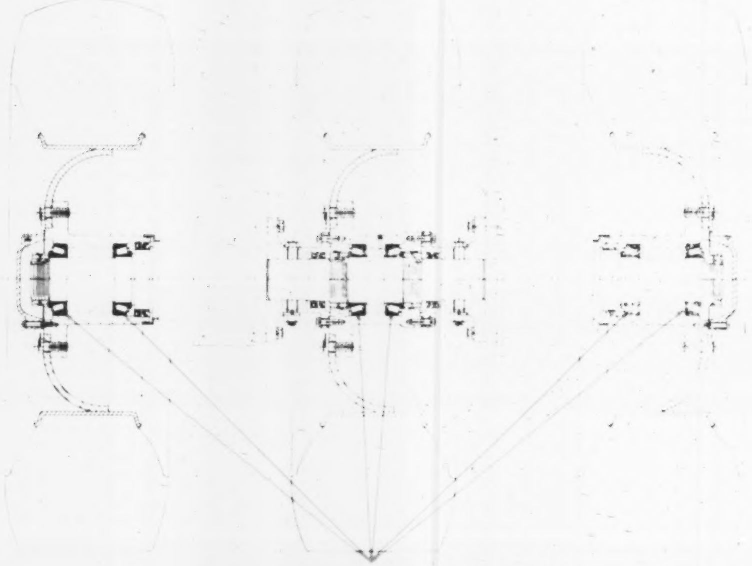
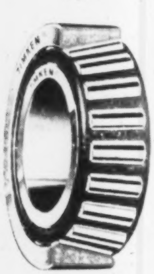
All forms of business and personal insurance including Life • Accident • Group • Fire • Marine • Automobile • Casualty • Bonds

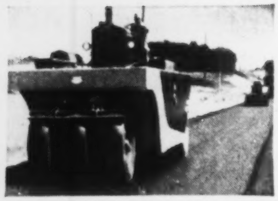
30 tons of compacting power roll on 20 Timken® bearings





Bros Incorporated reports: "We specified Timken bearings because they carry heavy loads at less cost."

"Experience on an earlier model led us to choose Timken roller bearings."



When this Bros Model 730 self-propelled pneumatic tire roller goes to work on surface, base and grade material, every bit of that 30 tons is carried by the Timken® tapered roller bearings in the front and rear wheels. (See diagram above for front axle mounting.) With Timken bearings to roll the load—not just in the wheels but in the transmission countershaft and pinion shaft, differential, drive axles and king post—customers of Bros Incorporated are assured of trouble free operation and longer bearing life with minimum maintenance. Here's why:

1. Timken bearings hold shafts concentric with their housings, make closures more effective—keep dirt out, lubricant in.

2. The tapered design of Timken bearings enables them to carry both radial and thrust loads, or any combination.

3. Full-line contact between rollers and races gives Timken bearings extra load carrying capacity. And their mirror smooth finish lets them roll practically friction free.

If you're building or buying better machines, make sure they're equipped with Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

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